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THESIS

EFFECT OF INCREASED OPERATIONAL TEMPO
(POST 9/11) ON RETENTION RATE OF HOSPITAL
CORPSMEN

by

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March 2005

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EFFECT OF INCREASED OPERATIONAL TEMPO (POST 9/11) ON THE
RETENTION RATE OF HOSPITAL CORPSMEN

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ABSTRACT

The purpose of this thesis is to explore the effect of increased operational tempo on the retention behavior of Navy Hospital Corpsmen in pay grades E1-E6. Two data files were obtained from the Defense Manpower Data Center, one for first term personnel on active duty on September 1, 1998 who were eligible to reenlist/separate prior to September 11, 2001 and another for those on active duty on September 11, 2001 who were eligible to reenlist/separate prior to March 2004. The two groups differed significantly in demographics and military background characteristics.

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TABLE OF CONTENTS

I.	INTRODUCTION AND BACKGROUND.....	1
A.	INTRODUCTION.....	1
B.	BACKGROUND.....	1
	1. Hospital Corps.....	1
	2. Operational Tempo.....	2
	3. Personnel Tempo of Operations Program (PERSTEMPO)	4
	4. Retention.....	5
C.	THE PURPOSE OF THE STUDY	6
D.	RESEARCH QUESTIONS.....	6
E.	ORGANIZATION	6
II.	LITERATURE REVIEW	9
A.	TURNOVER AND RETENTION IN THE CIVILIAN SECTOR.....	9
B.	HEALTHCARE TURNOVER	10
C.	MILITARY TURNOVER.....	11
D.	OPERATIONAL TEMPO AND RETENTION	14
E.	CONCLUSION	18
III.	DATA AND METHODOLOGY	21
A.	DATA SOURCE AND RESTRICTIONS.....	21
	1. Data Source.....	21
	2. Data Restrictions.....	21
B.	DEPENDENT AND EXPLANATORY VARIABLES.....	22
	1. Data Description by Year	23
	2. Data Description by Reenlistment status.....	26
C.	METHODOLOGY	30
	1. Theoretical Model	30
	2. Multivariate Logistic Regression Model.....	30
IV.	VARIABLE DEFINITIONS.....	33
A.	DISCUSSION.....	33
	1. Explanatory Variables Defined	33
	a. <i>Demographic Variables</i>	33
	b. <i>Military Experience Variables</i>	35
	2. Dependent Variable (STAY).....	36
V.	RESULTS OF THE ANALYSIS.....	39
A.	DISCUSSION.....	39
B.	RESULTS – 1998 MODEL	39
	1. Goodness of Fit.....	39
	a. <i>Global Null Hypotheses Test</i>	39
	b. <i>R-Square</i>	40
	c. <i>Classification Table</i>	41
	2. Interpretation and Evaluation of Coefficients	41
	3. Significant Variables and Partial Effects.....	46

	a.	<i>Notional Person</i>	46
	b.	<i>Partial Effects</i>	46
	4.	Restricted Model Tests	48
	5.	Potential Problems with the 1998 Model	51
C.		RESULTS – 2001 MODEL	53
	1.	Goodness of Fit.....	53
	a.	<i>Global Null Hypotheses Test</i>	53
	b.	<i>R-Square</i>	54
	c.	<i>Classification Table</i>	54
	2.	Interpretation and Evaluation of Coefficients	54
	3.	Significant Variables and Partial Effects.....	57
	a.	<i>Notional Person</i>	57
	b.	<i>Partial Effects</i>	57
	4.	Restricted Model Tests	59
	5.	Potential Problems with the 2001 Model	61
D.		COMPARISON OF THE RESULTS FROM THE 1998 AND 2001 LOGISTIC REGRESSION MODELS	63
E.		COMPARISON OF THE 1998 AND 2001 PARTIAL EFFECTS RESULTS	65
F.		CONCLUSION	66
VI.		CONCLUSIONS AND RECOMMENDATIONS.....	69
	A.	CONCLUSIONS	69
	B.	RECOMMENDATIONS.....	71
		LIST OF REFERENCES.....	73
		INITIAL DISTRIBUTION LIST	77

LIST OF TABLES

Table 2.1	Explanatory Variables Kerr 1997	13
Table 3.1	Number of First Term Hospital Corpsmen by year of Reenlistment Eligibility	22
Table 3.2	Characteristics of First Term Hospital Corpsmen Eligible to Reenlist, 1998 and 2001	23
Table 3.3	Reenlistment Status for First Term Hospital Corpsmen Percent Stayers	26
Table 4.1	Explanatory Variables and Expected Signs	37
Table 5.1	Global Null Hypothesis Test for 1998 Regression Model.....	40
Table 5.2	R-Square and Max-rescaled R-Square for 1998 Regression Model.....	40
Table 5.3.	Classification Table for 1998 Regression Model.....	41
Table 5.4.	Logistic Regression Results 1998 N=4340.....	42
Table 5.5.	Partial Effects 1998 Logit Model.....	48
Table 5.6.	1998 Model Joint Significance Test for Family Status.....	49
Table 5.7.	1998 Model Joint Significance Test for Pay Grade	49
Table 5.8.	1998 Model Joint Significance Test for Occupational Specialty.....	50
Table 5.9.	1998 Model Joint Significance Test for Deployment Status	50
Table 5.10.	1998 Model Joint Significance Test for Race/Ethnic Status	50
Table 5.11.	1998 Model Joint Significance Test for Current Ag.....	51
Table 5.12	Test for Multicollinearity in the 1998 Model	52
Table 5.13	Global Null Hypothesis Test for 2001 Logistic Regression Model.....	53
Table 5.14	R-Square and Max-rescaled R-Square for 2001 Logistic Regression Model..	54
Table 5.15	Classification Table for 2001 Logistic Regression Model	54
Table 5.16	Logistic Regression Results 2001 N=3233.....	55
Table 5.17.	Partial Effects 2001 Logit Model.....	59
Table 5.18.	2001 Model Joint Significance Test for Family Status.....	60
Table 5.19	2001 Model Joint Significance Test for Pay Grade	60
Table 5.20	2001 Model Joint Significance Test for Occupational Specialty.....	60
Table 5.21	2001 Model Joint Significance Test for Deployment Status	61
Table 5.22	2001 Model Joint Significance Test for Race/Ethnic Status	61
Table 5.23	Test for Multicollinearity in the 2001 Model	62
Table 5.24	Comparisons of Variables in the 1998 and 2001 Logistic Regression Models.....	64

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I. INTRODUCTION AND BACKGROUND

A. INTRODUCTION

Since the introduction of the All Volunteer Force in 1973, the Department of Defense (DOD) has invested heavily in retention research. These studies are aimed at identifying factors that influence retention and provide a means of forecasting future behavior of the military force. Given the vast sums invested in recruiting, training and retention, the DOD must continually find ways to protect its greatest asset, that is, its personnel.

One of the added challenges the DOD faces that may significantly impact personnel behavior is increased deployments. Since the beginning of the 1990s, the number of deployments has increased and continues to do so (Hosek & Totten, 2002). Several studies have concluded that increased deployments have little or no negative influence on retention. Whether or not this continues to be the case, given the recent events of September 11th and Operation Iraqi Freedom, is yet to be determined.

B. BACKGROUND

1. Hospital Corps

The Hospital Corps came into existence as an organized unit of the Medical Department under the provision of an act of Congress approved 17 June 1898. Today, there are 24,602 Sailors serving in the Hospital Corpsman rating, making it the largest enlisted rating in the Navy (Bureau of Navy Personnel web page). Hospital Corpsmen earn their title after completion of a 14 week course that includes training in medical fundamentals, emergency medical procedures, nursing procedures, general military training and health promotion topics. Additionally, students receive two weeks practical experience in “hands on” nursing care prior to graduation. Upon graduation, students are assigned to ships, hospitals, clinics, Marine units, air wings, and Seabee units in the United States and in a variety of overseas locations. Some students go on to more specialized training such as laboratory, x-ray or pharmacy technicians. About 4,000 hospital corpsmen are trained annually at the Naval Hospital Corps School in Great Lakes, Illinois (Naval Hospital Corps School, Great Lakes web page).

Today's Hospital Corpsmen perform as assistants in the prevention and treatment of disease and injury. They assist with physical examinations, provide patient care, and administer medicine. They also perform general laboratory, pharmacy x-ray, and other patient support services. Hospital Corpsmen assist in the administrative, supply, and accounting procedures within medical departments ashore, afloat, and with the Marine Corps, and instruct medical and non-medical personnel in first aid, self aid, personal hygiene, and medical records maintenance. In addition, they assist in the maintenance of environmental health standards, and they are prepared to assist in the prevention and treatment of Chemical Biological and Radiological (CBR) casualties and in the transportation of the sick and injured. Senior Hospital Corpsmen perform technical planning and management functions in support of medical readiness and quality healthcare delivery. In addition to their general assignments, Hospital Corpsmen trained as technicians perform specialized functions within the operational forces, clinical specialties, and administrative department, and they may be assigned duties independent of a medical officer. These complex duties require that each Hospital Corpsman have broad-based training and versatility neither demanded nor expected of other enlisted ratings (Naval Hospital Corps School, Great Lakes web page).

2. Operational Tempo

The operational tempo (OPTEMPO) of the United States military has increased dramatically since the end of the Cold War. Today's military personnel face deployments of increasing frequency, many of which are unplanned and unforeseen (Fricker, 2002). Since 11 September 2001, approximately one-third of the fleet has been deployed on any given day (Krol, 2002). This percentage of deployed units is similar to the peacetime profile, with forty to fifty percent of the Fleet underway, and approximately thirty percent of forces forward deployed. Although the number of ships underway and deployed has not dramatically increased during Operation Enduring Freedom and Operation Noble Eagle, the operational tempo (OPTEMPO) of deployed front-line units has accelerated. Surface combatants are steaming fifty percent more days per quarter than they would during a routine deployment. The greater operational demands have been felt even more acutely by carrier air wings during Operation Enduring/Iraqi Freedom. Flight hours increased from an average of 115 hours per day

during typical peace time deployments to a high of 250 hours per day at the peak of operations and 190 hours as operations subsided (Krol, 2002).

The role of the Navy and Marine Corps on the world stage has expanded. In addition to combat operations in Afghanistan, 2001 saw the Navy and Marine Corps on station and on call worldwide, supporting joint operations and theatre engagement efforts. Sailors and Marines from U.S. bases manned a rotational deployment force that included Aircraft Carrier Battle Groups (CVBGs), Amphibious Ready Groups (ARGs), Marine Expeditionary Units (Special Operations Capable) (MEU (SOCs)), strategic deterrence patrols, and maritime patrol aircraft detachments. In addition, Naval Forces from bases in Japan, Hawaii, and on the West Coast continued to provide a visible overseas presence in Asia. The Navy-Marine Corps Team performed humanitarian assistance and other missions in support of an International Force in East Timor. Navy ships operated in the Mediterranean Sea, Marines deployed in MEUs operated ashore in Kosovo, Marine Fleet Anti-Terrorism Security Teams deployed to Cuba, Yemen, Bahrain and the Republic of the Philippines, and three Navy ships, manned by over 3,200 Sailors and Marines, participated in the annual UNITAS deployment to South America. Additionally, forward deployed submarines performed intelligence, surveillance and reconnaissance (ISR) operations in support of national, joint, and service collection requirements (FY 2004 Department of the Navy Budget).

With increased deployments, more time at sea and less at home, there is a growing concern as to whether or not the Armed Forces can continue to sustain recruitment and retention levels. Though many anticipate that increased deployments will have a negative effect on retention rates, numerous studies have found the opposite (Hosek & Totten, 2002).

The Hospital Corpsman rating is no stranger to deployments and is as severely impacted as any other rating. Given the extensive deployment platforms to which Corpsmen are assigned, i.e. aircraft carriers, ships, landing crafts, squadrons, submarines, fleet hospitals, Marine units, as well as the variability in assignments, it is difficult to anticipate a reduction in deployment rates as operational tempo remains high.

3. Personnel Tempo of Operations Program (PERSTEMPO)

Certain levels of operational tempo (OPTEMPO) are associated with most military assignments. Personnel assigned to ships expect the usual deployments and work-up associated with a sea-going billet and those assigned to operational commands anticipate deployments for training exercises, humanitarian missions and other contingencies. In an effort to ensure that operation tempo remains manageable and does not adversely impact the quality of life of its Sailors and their families, the Navy instituted the Personnel Tempo of Operations (PERSTEMPO) Program in October, 1985.

OPNAV Instruction 300.13B outlines policy and reporting requirements for the (PERSTEMPO) Program. This program was a combined effort of the Secretary of the Navy (SECNAV), the Chief of Naval Operations (CNO) and the Fleet Forces Commander to eliminate excessive operating tempo (OPTEMPO) for ships and aircraft squadrons as well as achieve long standing PERSTEMPO limits. The goal of the program is to balance support of national objectives with reasonable operating conditions for navy personnel while maintaining the professionalism associated with going to sea and providing a reasonable home life.

Normal operating procedures includes the following three criteria:

1. Maximum deployment length of six months, portal to portal
2. Minimum 2.0:1 Turn Around Ratio (TAR) between deployments. TAR is the ratio between the number of days a unit spends at home between deployments and the length of the last deployment in days.
3. Minimum of 50 percent time in homeport for a unit over a 5 year cycle calculated three years home and two years deployed based on current schedules.

OPNAV Instruction 300.1B is applicable to all active Navy commands and other units that operate/deploy from their homeport either as a unit or as a detachment, specifically:

- USN ships and attack submarines
- USN aircraft squadrons/detachments

- USN seagoing or deploying staffs and detachments
- USN special warfare units/detachments.

Because operating cycles and missions are unique, some units are unable to meet the CNO's PERSTEMPO goals. To assist these special units, the PERSTEMPO program standards provide sensible and equitable operating guidelines. Units that are considered special for the purpose of PERSTEMPO are:

- Permanently forward-deployed units operating with rotating crews
- Navy Mobile Construction Battalions
- Fleet Ballistic Missile Submarines
- Any operating/deploying command/unit whose personnel are assigned for less than a notional 3-5 year tour length and receive compensation for extended operating time beyond PERSTEMPO program limits.
- Aviation Training Squadrons
- Cryptologic Support Personnel.

The primary thrust of the PERSTEMPO program is to preserve quality of life while meeting national objectives. The Navy's contract with its Sailors dictates that Navy leadership give maximum effort to ensure the highest possible quality of life and monitor closely the priority of established and new commitments with respect to the Sailor's home life. If the Navy can successfully balance its requirements while meeting the quality of life needs of its Sailors, then retaining qualified personnel should become a less challenging task.

4. Retention

Since 1974, defense drawdown has resulted in increased concern about retaining the most qualified personnel. The ability of the Navy to continue to retain highly skilled Sailors is one of its most significant challenges. Factors affecting personnel retention include but are not limited to the stability of the economy, satisfaction with military life, family influences, special options such as choice of location and opportunity to retrain,

and higher comparative wages in the civilian sector. The Navy's ability to retain the right mix and quantity of personnel is crucial to its continued success.

Every year, thousands of enlistees in the Hospital Corpsman rating face a reenlistment decision. The effect of these decisions has a profound impact on future manpower requirements for the Navy. A significant reduction in retention rates would create a shortage of experienced personnel. Such a shortage would adversely impact operational efficiency and the Navy's ability to sustain high, effective and efficient levels of healthcare during wartime and non war-fighting missions. To maintain end-strength, each separation ultimately requires an additional entrant into the manpower pipeline. The associated cost of recruiting and training each new enlistee represents defense dollars that could be better spent elsewhere.

C. THE PURPOSE OF THE STUDY

The purpose of this study is to identify the factors that are of significant importance in determining reenlistment behavior among Hospital Corpsmen in pay grades E1-E6. The analysis focuses on the impact of deployments and number of deployments on the probability of retention but also includes other factors such as job specialty and duty station location.

D. RESEARCH QUESTIONS

The primary research question of this thesis is whether or not the increased operational tempo influenced by the events of September 11th has had any effect on the retention rate of Hospital Corpsmen in pay grades E1-E6. Secondary research questions include:

- Are those personnel facing increased deployments less likely to reenlist than those non-deployed?
- Do the factors affecting the reenlistment decision vary significantly by gender?
- Does job specialty have any effect on the reenlistment decision?

E. ORGANIZATION

Chapter II offers a review of the literature dealing with the issues of retention and operational tempo. Chapter III presents a detailed description of the data employed, results of preliminary data analysis of the 1998 and 2001 cohort data files and describes

the methodology used to collect and analyze the data. Chapter IV explains the selection of the explanatory and dependent variables. Chapter V presents the results of the Logistic Regression model for both cohort data files. Chapter VI offers conclusions and recommendations based on the analysis.

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II. LITERATURE REVIEW

A. TURNOVER AND RETENTION IN THE CIVILIAN SECTOR

The retention of highly qualified personnel is an issue that all organizations must continually address. All employers, including the military, are concerned with employee retention for several reasons. One of the most important reasons is that high rates of employee turnover are quite costly. Organizations spend substantial financial resources searching for qualified applicants to fill vacant positions and training new personnel. Furthermore, there are costs associated with the loss of productivity and readiness that can result from high levels of turnover in the workforce (Weiss, MacDermid, Strauss, Kurek, Le & Robbins, 2002).

Porter, Steers, Mowday, and Boulian (1974) conducted a longitudinal study assessing the effects of organizational commitment, job satisfaction, and turnover among recently employed psychiatric technician trainees. Organizational commitment was defined as the strength of an individual's involvement and identification with a particular organization. The results indicated that individual attitudes are predictive of turnover behavior. Employees who ultimately leave the organization have less favorable attitudes than those who remain. The attitude-turnover relationship was found for only the last two time periods of the measuring process, suggesting that the association between attitudes and turnover is strongest at the point most proximal to the employees' departures. The authors also found that organizational commitment discriminated better between the stayers and leavers than the various components of job satisfaction (Glaser, 1996).

Jackofsky (1984) generated a conceptual model that integrated turnover and job performance. The model took into consideration such factors as ease of movement (e.g. expectation of finding alternatives), job satisfaction and intent to quit. One prediction based on the model was that there would be a curvilinear relationship between job performance and turnover. Testing two diverse populations (accountants and truck drivers) a curvilinear relationship of performance and turnover was found. However, there was not perfect symmetry between the high and low end of performance. Even

though turnover did increase as a function of job performance, it did so more quickly at the lower end of performance rather than at the higher end of the spectrum (Glaser, 1996).

B. HEALTHCARE TURNOVER

The economic boom of the 1990s created an unprecedented period of prosperity, characterized by low inflation and low unemployment. During this period, the labor market for critical healthcare personnel tightened dramatically. Good economic times combined with ever-expanding career opportunities have exacerbated the cyclical labor shortages in healthcare. While much has been written about the current nursing shortage, healthcare organizations are also facing a decreasing supply of caregivers in general and in certain critical support positions. Retaining quality employees is a considerable challenge for Chief Executive Officers (CEOs) of healthcare organizations. (Ashbaugh, 2003)

In these times of staff shortages, higher volumes, and dwindling profit margins, the healthcare industry needs to rely on a focused strategy. Its goal should be to retain its workforce to regain its potential to succeed (Barney, 2002). The cost of replacing a nurse is estimated to be from \$10,000 to \$145,000 depending on the type of job, level of experience and the clinical skills. Although shortages are more severe among nurses, radiology, pharmacy and laboratory technicians are also experiencing severe shortages (Eckberg, 2002). The turnover rate in the assisted living community is forty-two percent among Certified Nursing Assistants (CNAs) (Galloro, 2001) while the turnover rate for the entire industry is twenty percent (Barney, 2002).

In 1998, Cangelosi, Markham and Bounds conducted a survey of nurses in six hospitals. Questionnaires were self-administered and 285 usable questionnaires were received. The questionnaire utilized a multiple choice scaled format and measured the responses as indicated below:

- Job satisfaction was measured using a five-point scientific semantic differential scale utilizing the bipolar adjectives “very satisfied” and “very dissatisfied”.

- Twenty-eight factors were examined as possible reasons for changing hospitals. These factors were measured using an itemized rating scale with response labels “major reason”, “minor reason” and “not a reason”.
- The adequacy of feedback concerning job performance was measured using a four-point itemized rating scale utilizing response labels “no feedback”, “some but not enough feedback”, “adequate feedback”, and excellent feedback”.
- Job-related stress was measured using a five-point itemized scale with response labels “always”, “often”, “sometimes”, “rarely”, and “never”.

The resulting data from the questionnaire were analyzed using frequency distributions, cross-tabulations, and Spearman’s rank correlation analysis.

The results from this survey showed that the principal reasons nurses change jobs fell into four categories: salary or benefits, convenience, work schedule and job related stress. Over 55 percent of the respondents listed better salary as a reason for changing jobs, 46.1 percent indicated convenience (newer job closer to home) and over 40 percent cited better work schedule and job-related stress as reasons for turnover.

The next aspect of the analysis involved selecting pairs of variables and applying correlation analysis. The strongest correlation existed among satisfaction and job-related stress. The relationship is inverse, indicating that nurses perceiving more stress experience less job satisfaction, leading to the conclusion that nurses do not thrive in stressful job circumstances. The relationship between present salary and present job satisfaction was not significant. This implies that nurses who make relatively more money are no more satisfied with their jobs than those making less money.

C. MILITARY TURNOVER

The issue of retention among military personnel has received a great deal of empirical attention. As a result, numerous studies have been undertaken to identify important factors related to the retention decisions and behavior of military personnel. One of the more common methods used to examine retention behavior in the military is the use of multivariate economic models of occupational choice and military behavior (Weiss et al., 2002). These models are based on the principles of general economic

models of occupational choice (Hogan & Black, 1991). One of the first multivariate models of retention behavior to be proposed on the basis of economic theory was the Annualized Cost of Leaving Model (ACOL). The basic premise of the ACOL model is that it compares the expected path of pecuniary and non-pecuniary returns to choosing to stay in the military versus the expected path of pecuniary and non-pecuniary returns to leaving the military immediately. If the value of the expected path of staying in the military is greater than that expected from leaving immediately, individuals will choose to stay (Warner & Goldberg, 1984). Pecuniary factors are those such as military pay and perceived earning opportunities in the civilian sector. Non-pecuniary factors are those associated with a particular occupational setting that do not directly relate to financial compensation, such as work hours, time away from home and family, preference for military service, and length of commute (Weiss et al., 2002).

Since the initial development of the ACOL model, there have been at least two major refinements. These refinements have resulted in the development of the ACOL-2 model and the Stochastic Cost of leaving model (Gotz & McCall, 1983). These more refined models represent a new class of multivariate models of military retention behavior, which have been termed the Dynamic Retention Models. The refinements of the initial ACOL model have been primarily statistical in nature and reflect the recognition of the problem of “unobserved heterogeneity”, which simply means that individuals differ by unobserved or unmeasured factors (Hogan & Black, 1991; Weiss et al., 2002).

The purpose of the multivariate models has been to help the military formulate policies concerning annual military pay raises, reenlistment bonuses, changes to the military retirement system, and changes to non-pecuniary job factors (Hogan & Black, 1991; Warner & Goldberg, 1984). In effect, once the model has been estimated for a specific population, specific pecuniary and non-pecuniary factors of interest can be entered into the retention equation and the effect of each factor on retention rates can be examined. An example of this approach can be found in the early work of Warner and Goldberg (1984) that examined the effects of sea duty on retention. After estimating the ACOL model, their results indicated that higher incidence of sea duty was associated with lower level of first-term retention rates in the Navy, regardless of the level of pay. It

could therefore be concluded that additional policies leading to additional time at sea would have a negative effect on retention rates (Warner & Goldberg, 1984). A second example of the application of the ACOL model to study military retention examined the relationship between Selective Reenlistment Bonuses (SRBs) and retention of Marine Corps enlisted personnel (Cyrnot, 1987). This study found that small increases in SRBs were associated with an increase in reenlistment in certain sub-populations of Marines, demonstrating the utility of the ACOL model in predicting retention rates from selective changes in reenlistment bonuses.

A study conducted by Kerr (1997) uses logistic regression to predict retention behavior among first term and second term Marines. In this study, Kerr uses data from the 1992 Department of Defense Survey of Officer and Enlisted Personnel and Their Spouses and information from the Active Duty Military Master and Loss file. Kerr then restricted the data to those Marines serving in their first and second term of enlistment, those with 2 years or fewer remaining on their current enlistment, those with no less than two and no more than 10 years of service as well as those between pay grades E-3 to E-6. Kerr proposed a conceptual model of retention of first-term and second-term enlisted Marines in which the reenlistment outcome was understood to be a function of demographic characteristics, military experience, cognitive satisfaction with military life, and concerns over force reduction, as well as external factors such as alternative civilian job opportunities. (See Table 2.1).

Table 2.1 Explanatory Variables Kerr 1997

Demographic	Race/ethnic group, marital status, education, entry-age, current age
Military Experience	Pay-grade, years of service, occupational specialty, deployment history and spousal influence
Cognitive	Measure of job satisfaction, concerns about force reductions and military met-expectations
External	Includes variables which measure a Marine's perceptions of the civilian labor market

Source: Author

To evaluate the model empirically, analyses were stratified by gender and enlistment resulting in separate analyses for each of the following groups:

- Male first-term Marines
- Female first-term Marines
- Male second-term Marines
- Female second-term Marines.

The results from the study demonstrated that many of the factors proposed were significant predictors of retention behavior, however, none of the factors analyzed were significant across all four groups. These results suggest that the processes that lead Marines to leave the service are somewhat different for first-term and second-term males and females.

D. OPERATIONAL TEMPO AND RETENTION

The issue of operational tempo and its effect on retention has been studied extensively. Several studies have shown that increased deployments have no negative effect on retention. In their study to determine whether deployments affect reenlistment Hosek and Totten (2002) utilized two models of deployment and reenlistment. One model treated reenlistment as a function of deployment indicators while the other used two equations: one for reenlistment and one for the length of time to promotion to E5. In this second model, deployment has both a direct and an indirect effect on reenlistment. The indirect effect is captured through the effect of deployment on time to promotion to E5, and the effect of the expected time to E5 on reenlistment. The model allowed the error terms in the promotion and reenlistment equations to be correlated, enabling the detection of unobserved factors affecting both outcomes. The model was estimated for each branch of service (Navy, Marine Corps, Air Force and Army) for first and second-term reenlistment decisions.

In the deployment /reenlistment model, Hosek and Totten (2002) estimated two specifications of the deployment variables: a main-effect specification where the deployment variables indicate the number of hostile and non-hostile deployments and a

full-interaction specification where the deployment variable indicates combinations of hostile and non-hostile deployments. In the two equation model, only the main effect-specification was estimated.

The data used were for service members facing a reenlistment decision during FY1996-FY1999. Deployments were counted over a three year period ending three months prior to the date of the member's reenlistment decision. Additionally, members in the study received deployment pay as well as bore some fixed and variable costs associated with deploying. As such, the deployment indicators reflect both deployment experience and the pay and cost associated with the deployment. The deployment reenlistment model treated reenlistment as a function of the member's deployment variables, education level, Armed Forces Qualification Test (AFQT) score category, occupational area, race/ethnicity, gender, dependency status, unemployment rate at entry, current unemployment rate, and fiscal year of reenlistment decision. The two-equation model employed the same variables in the reenlistment equation but added the expected time to promotion to E-5. The promotion equation included the variables utilized in the reenlistment model as well as promotion speed to E-4, and indicators of the calendar quarter in which the member enlisted.

From the one-equation model, Hosek and Totten (2002) were able to conclude that, with very few exceptions, reenlistment among members who deployed was as high as reenlistment among members who had not deployed and in some cases even higher.

Further, the effect of deployment on reenlistment when negative was very small. For first term enlistees, reenlistment was higher in cases of non-hostile deployments but did not change with respect to hostile deployments. The authors found that in the Army, Air Force and Marine Corps reenlistment increased with the number of non-hostile deployments, however, for the Navy, reenlistment was higher among members with some deployment but did not increase with the number of non-hostile deployments.

The effect of hostile deployment on reenlistment was typically very small. In the main-effect specification, there was minimal change in reenlistment when the number of hostile deployments increased. This was true in the full-interaction model for the Army and Marine Corps. However, for the Navy and Air Force, reenlistment decreased as the

number of hostile deployments increased. Overall, the effect of hostile deployments was small when compared to non-hostile deployments. For second term enlistees, reenlistment increased with the number of non-hostile deployments and increased with the number of hostile deployments up to two. However, reenlistment declined somewhat for Army and Marine Corps personnel with three or more hostile deployments but did not decline for Navy or Air Force Personnel. Additionally, months deployed had a negative effect on reenlistment for the Air Force, Navy, and Marine Corps but a positive effect on reenlistment for the Army.

The joint model of promotion speed and reenlistment indicated that time to E-5 was shorter with a greater number of non-hostile deployments but was not significantly affected by the number of hostile deployments. Hosek and Totten (2002) further concluded that although deployment tended to reduce time to E-5, the effect was very small. They further determined that a shorter expected time to E-5 only resulted in a slightly higher probability of reenlistment. The authors also found that regardless of deployment type, members with dependents had a higher reenlistment probability which tended to increase with the number of hostile and non-hostile deployments.

Cooke, Marcus and Quester (2002) used logistic regression to analyze the impact of PERSTEMPO on Navy enlisted retention. A 1980 data file obtained from DMDC was utilized for their study. Three basic samples were used for the analysis which are (1) four-year obligors at their first reenlistment decision, (2) married four-year obligors at their first reenlistment decision and (3) reenlistment decisions of individuals with eight to ten years of service. The analysis included demographic variables such as ethnicity and marital status; occupation category variables such as supply and medical; fleet/ship type; PERSTEMPO variables such as percentage of time underway and not deployed, long deployments, short deployments, time between deployments and time since deployments; and economic variables such as military/civilian pay and unemployment rate.

The study revealed that the percentage of time underway when not deployed and longer deployments have a negative effect on retention for first-term enlistees. The effects are largest for married sailors who comprise approximately one-third of those making reenlistment decisions as well as for sailors in sea intensive occupations. The

estimates further indicate that reductions in retention associated with significant increases in PERSTEMPO measures can be offset by increasing military compensation by five percent relative to the civilian earnings of young men, or by offering a one-to-two level Selective Reenlistment Bonus (SRB) increase across the board. For sea intensive ratings, a much larger SRB would be required (Cooke et al., (2002).

In testimony presented to the House Armed Services Committee, Subcommittee on Total Force, James Hosek (2004), spoke about deployment, retention and compensation. Hosek (2004) commented that his observations had led him to believe that active duty personnel had proven to be highly resilient to the demands placed on them by deployments. He also noted that analysis of past data typically showed that deployments did not decrease retention and in many cases increased it. He also alluded to the fact that the effort to keep military pay competitive with civilian pay was strengthened by the National Defense Authorization Act of FY2000 and subsequent pay legislation. He felt it was extremely important that this effort was strengthened prior to September 11, the war on terrorism, and the operations in Afghanistan and Iraq.

Hosek (2004) based his analysis of deployment and retention on data from 1993 to 1999. Two classes of deployments, hostile and non-hostile are used. Hostile deployments include areas or circumstances involving imminent danger, for example, the operations in Haiti and Somalia. Non-hostile includes sea voyages in non-hostile waters, disaster relief, humanitarian aid and nation building.

In his analysis, Hosek (2004) found that hostile deployments had little effect on reenlistment of first-term personnel; Hostile deployments were associated with a higher level of reenlistment for second-term personnel; Non-hostile deployments typically increased first-term reenlistment above that of non-deployed personnel and this pattern was even more evident for second-term personnel. Additionally, a companion study of officers revealed similar relationships between deployments and officer continuation rates.

While the preceding studies focused on the active duty community, similar studies have been conducted in the reserve community. The first major mobilization of the reserve forces since Korea was Operation Desert Shield/Storm. Since then, reserve

personnel have participated in every major foreign deployment. Since 1994, Reserve Component members have been activated or volunteered to support Operation Restore Democracy (Haiti), Operation Provide Promise and Deny Flight (Bosnia), Operation Restore Hope (Somalia), Operation Southern watch (Southern Iraq), Operation Provide Comfort (Northern Iraq) (Kirby & Naftel, 1998) and most recently, Operation Enduring Freedom/Iraqi Freedom.

Kirby and Naftel (1998) used logistic regression to determine the probability of reenlistment for reserve personnel who had been mobilized. Consistent with the findings of studies conducted on active duty personnel; they determined that mobilization had no apparent effect on reenlistment. Particularly, the Operation Desert Shield/Storm experience did not have an adverse effect on the likelihood of remaining in the Reserve Components. Kirby and Naftel (1998) did find a small and positive effect on retention among those with higher probabilities of being called up in the event of future mobilizations.

A review of the literature on operational tempo and its effect on retention shows that the effect varies among services and groups. Hosek and Totten (2002) showed that reenlistment increased with the number of non-hostile deployments in the Army, Marine Corps and Air Force but did not increase in the Navy. Further, reenlistment decreased for the Navy and Air Force as the number of hostile deployments increased. Given the missions of the Marine Corps and Army and the increased likelihood of participating in combat and related missions, their tolerance for combat and hostile environments may be higher and therefore could explain the positive impact of hostile deployments on reenlistment. Additionally, Personnel can develop a greater sense of patriotism during periods of conflict thus reflecting the positive relationship between the reenlistments and deployments. Inability to leave the service as a result of stop loss/stop move policy can be a contributing factor, however, once these policies are lifted the member is faced with the decision to stay or leave.

E. CONCLUSION

An overview of the literature shows that turnover is a problem among civilian healthcare workers. No studies have focused primarily on operational tempo and

retention in the Hospital Corpsman rating but many studies have addressed the problem of turnover in general, the issue of turnover among civilian healthcare workers and several military ratings as well as the effects of operational tempo on retention. Given the variety of technical fields associated with the Hospital Corpsman rating, shortages in the civilian healthcare industry and higher comparative wages in the civilian sector, it is possible that adverse factors such as increased deployments could potentially lead to a decrease in retention for Hospital Corpsmen.

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III. DATA AND METHODOLOGY

A. DATA SOURCE AND RESTRICTIONS

1. Data Source

This thesis uses two data bases, a 1998 data file of all Hospital Corpsmen on active duty on 1 September of that year and eligible to reenlist prior to September 11, 2001 and a 2001 data file consisting of all Hospital Corpsmen on active duty on 11 September of that year and eligible to reenlist prior to 31 March 2004. Both data files were obtained from the Defense Manpower data Center (DMDC).

The data consist of active duty enlisted personnel in the Hospital Corpsman rating pay grades E-1 through E-6. The combined data set includes 36,243 Hospital Corpsmen serving on shore duty, sea duty, overseas sea duty, overseas shore duty and overseas remote land-based duty. Since the goal of the thesis is to evaluate the impact of increased deployments on reenlistment behavior, deployment history was described as a single deployment, multiple deployments or no deployment. To investigate the effects of job specialty on reenlistment, the 67 Navy Enlisted Codes (NEC) that apply to Hospital Corpsmen were grouped into 10 categories: Fleet Marine Force (FMF), General Duty Hospital Corpsman, Basic X-ray Technician, Advanced X-ray Technician, Lab Technician, Psychiatry Technician, Surgical Technician, Pharmacy Technician, Preventive Medicine Technician and Other Navy Enlisted Codes not represented above. Standard demographic variables such as gender, age and race were included in the data file as well as information on pay grade and level of education. Both data files contain information on reenlistment behavior indicating whether an individual Corpsman had reenlisted, separated or extended.

2. Data Restrictions

This thesis focuses on sailors in their first enlistment term. Based on the Literature review, it is believed that those sailors in their first term of service present the most interesting data for predicting retention behavior. Sailors in the second term of service and beyond have a higher propensity to remain in the service given the time invested and are influenced by the effects of retirement. Since Hospital Corpsmen enter the service with a minimum enlistment contract of 4 years, personnel with less than 3

years of service are not eligible to make a reenlistment decision and were therefore eliminated. Additionally, personnel with less than 3 years of service are usually restricted to schools and minimal time at the first duty station therefore limiting their knowledge and experience in the Navy which could impair their ability to make an informed reenlistment decision.

Since the purpose of this thesis is to examine retention behavior, individuals in the sample who had extended were deleted from the sample. Because a service member can extend for very short periods of time, the decision to extend is not always indicative of intent to continue on active duty for a lengthy period. The decision to delete extenders was made because the data did not provide any information on the period of time such members had extended.

Personnel below the rank of E-3 were not included in the data set. The decision to eliminate this group was made because sailors are automatically promoted to the rank of E-3 if they have met the required time in service which is approximately 15 months. As such, it is unlikely that a Hospital Corpsman with 4 years of service will be in pay grade E-2.

Once the above restrictions were imposed, and all observations with missing values were deleted, the final combined data set consisted of 7,573 observations. Table 3.1 shows the number of observations by year of reenlistment eligibility.

Table 3.1 Number of First Term Hospital Corpsmen by year of Reenlistment Eligibility

Year	Number
1998	4,340
2001	3,233

Source: Author

B. DEPENDENT AND EXPLANATORY VARIABLES

The dependent variable “STAY” is a binary variable indicating whether a first term Hospital Corpsman reenlisted. Those Hospital Corpsmen who were eligible to

make a reenlistment decision and had reenlisted are considered “STAYERS” and are represented by a 1. Those who had separated are considered “LEAVERS” and are represented by a 0.

The candidate explanatory variables for the reenlistment decision are grouped into categories based on the literature review. Demographic variables include: current age, marital status, number of dependents, gender, race/ethnic group and education. The military experience variables include: pay grade, occupational specialty, deployment status, duty type, enlistment term and military spouse.

1. Data Description by Year

Table 3.2 provides a description of the Hospital Corpsmen in the data set by year. Frequency distributions and descriptive statistics are used to provide some insight into the characteristics of the Hospital Corpsmen in the 1998 and 2001 samples.

Table 3.2 Characteristics of First Term Hospital Corpsmen Eligible to Reenlist, 1998 and 2001

Characteristics (%)	1998 N=4340	2001 N=3233
Gender (%)		
Male***	65.30	75.07
Female***	31.52	24.93
Race/Ethnic (%)		
White ***	64.01	47.20
Black***	15.18	19.39
Hispanic***	12.28	15.53
Other Race***	8.53	17.88
Education (Highest Level) (%)		
High School	96.54	96.54
Some College	3.46	3.46
Dependents (%)		
No Dependents	59.31	61.43
One or Two Dependents**	35.74	33.19
Three or More Dependents	4.95	5.38
Marital Status (%)		

Single***	53.02	61.92
Married with Military Spouse***	10.92	2.94
Married with Civilian Spouse	36.06	35.14
Current Age		
Age (Mean, in years)+	23.77	24.31
Duty Type (%)		
Sea Duty	28.89	28.09
Shore Duty	71.11	71.91
Deployment Status (%)		
No Deployments***	89.17	76.80
Single deployment***	9.47	19.02
Multiple Deployments***	1.36	4.18
Pay Grade (%)		
E3***	31.43	28.24
E4	65.99	67.27
E5/E6***	2.56	4.48
Occupational Specialty (%)		
General Duty Corpsman***	41.77	19.24
Fleet Marine Force Corpsman***	34.86	53.39
Surgical Technician	3.69	4.18
Psychiatry Technician	1.38	1.52
Advanced X-ray Technician*	0.39	0.15
Basic X-ray Technician*	1.84	2.44
Pharmacy Technician***	3.18	5.60
Laboratory Technician	3.16	3.12
Preventive Medicine Technician**	1.06	1.58
Other Occupational Specialties	8.66	8.78
Retention (%)		
Stay***	31.52	51.62

*** Chisq statistic significant at .01 level

** Chisq statistic significant at .05 level

* Chisq statistic significant at .10 level

+ T-statistic for difference in means significant at .01 level

Source: Author

A preliminary bivariate analysis looking at the data by year provides insight into the retention behavior of Hospital Corpsmen after 11 September, 2001 as opposed to the earlier time period as shown in Table 3.1. Demographically the two groups are very different. The first term data for 1998 and 2001 show that males made up the majority of each sample accounting for 65.30 percent in 1998 and 75.07 percent in 2001. This significant increase in the percent male indicates that a larger percentage of males have chosen to enlist in the service after September 1998. The percent of whites in the 1998 sample is 64.01 percent. This is significantly higher than the 47.20 percent in the 2001 sample. The percentage of the sample with a high school education is the same for both data sets at 96.54 percent. The percentage of the 2001 sample with one or more dependents is only slightly lower than the 40.69 percent in the 1998 sample at 38.57 percent. Only 38.08 percent of the 2001 sample is married compared to 46.98 percent in the 1998 sample, a significant decline. Only 2.94 percent of the 2001 sample has an active duty spouse which is significantly lower than the 10.92 percent in the 1998 sample. The average age of the sample for 2001 is slightly but significantly higher than for the 1998 sample at 24.31 and 23.77 years respectively.

The distribution of Hospital Corpsmen between sea and shore duty is approximately the same. The percentage of the sample stationed at sea in 1998 is 28.89 percent which is similar to the 28.09 percent represented in the 2001 sample.

Approximately 9.47 percent of the 1998 sample has experienced a single deployment which is significantly lower than the 19.02 percent in the 2001 sample. The percentage of the sample with multiple deployments in 1998 is 1.37 percent. This is considerably lower than the 4.18 percent who had multiple deployments in the 2001 sample.

Hospital Corpsmen eligible to reenlist in 2001 were significantly more likely to be in the top pay grade category (E5-E6) than their 1998 counterparts. Approximately 66 percent of the 1998 sample represents pay grade E4 which is slightly lower than the 67.27 percent in the 2001 sample.

The occupational distributions of the 1998 and the 2001 samples are significantly different for six of the specialties. This is particularly true for the two largest Corpsmen

occupational groups, General Duty Corpsmen and Fleet Marine Force Corpsmen. The largest occupational group for the 1998 sample is General Duty Corpsmen representing 41.77 percent. However, the majority of the 2001 sample is made up of Fleet Marine Force Corpsmen representing 53.39 percent of the sample.

Finally there is a significant difference in the retention behavior for both data sets. In the 1998 sample only 31.52 percent reenlisted compared to 51.62 percent in the 2001 sample.

In summary, very significant differences exist across the data set by year. The Corpsmen in the 2001 sample are older, more likely to be male, have attained higher rank and have experienced more deployments than their counterparts in the 1998 sample – all factors that would be expected to be associated with higher retention. However, they are also less likely to be married or have dependents – factors that are often associated with lower retention. Occupational specialty has also shifted drastically with General Duty Corpsman being replaced by Fleet Marine Force Corpsman as the dominant occupational designation. In light of these changes, it is not surprising that retention is quite different for the two groups.

2. Data Description by Reenlistment status

Table 3.3 provides a more detailed insight into the reenlistment status for each reenlistment eligibility year group.

Table 3.3 Reenlistment Status for First Term Hospital Corpsmen Percent Stayers

Characteristics	1998 N=4340	2001 N=3233
Gender		
Male	33.63	51.01
Female	27.56	53.47
Race/Ethnic		
White	27.65	45.61
Black	39.76	56.30
Hispanic	33.02	51.20

Other Race	43.78	62.80
Education (Highest Level)		
High School	31.69	51.78
Some College	26.67	47.32
Dependents		
No Dependents	28.75	48.44
One or Two Dependents	34.17	55.08
Three or More Dependents	45.58	66.67
Marital Status		
Single	30.16	48.80
Married with Military Spouse	31.01	52.63
Married with Civilian Spouse	33.67	56.51
Current Age		
Age (Mean for stayers, in years)	23.95	24.43
Age (Mean for leavers, in years)	23.68	24.17
Duty Type		
Sea	39.00	48.13
Shore	28.51	52.99
Deployment Status		
No Deployments	26.41	47.85
Single Deployment	72.51	62.28
Multiple Deployments	81.36	72.59
Pay Grade		
E3	29.47	41.29
E4	32.26	54.57
E5/E6	37.84	72.41
Occupational Specialty		
General Duty Corpsman	28.79	45.34
Fleet Marine Force Corpsman	34.57	47.57
Surgical Technician	23.13	54.07

Psychiatry Technician	13.33	63.27
Advanced X-ray Technician	11.76	80.00
Basic X-ray Technician	43.75	86.08
Pharmacy Technician	28.99	61.88
Laboratory Technician	37.23	63.37
Preventive Medicine Technician	47.83	80.39
Other Occupational Specialties	34.04	60.92

Source: Author

Overall, retention rates increased by approximately 20 percentage points from 1998 to 2001. In 1998 the reenlistment rate for males was higher than that of females with 33.63 percent and 27.56 percent respectively. In 2001, reenlistment rates increased more dramatically for females than males which consequently resulted in a higher reenlistment rate for females. The reenlistment rates for males and females in 2001 were 51.01 percent and 53.47 percent respectively.

The retention rates among the different race/ethnic groups increased dramatically in 2001. The largest increase was among the “other race” group, those who were not white, black or Hispanic which increased by approximately 19 percentage points. The OTHERRACE group was the most likely to reenlist in each of the two years followed by blacks. Whites had the lowest reenlistment rate in both periods, although the percent who reenlisted increased by 18 percentage points.

Retention rates increased for both educational levels in 2001 compared with 1998. Both high school graduates and those with some college showed a twenty percentage point increase in retention for 2001. Personnel with a high school diploma were more likely to reenlist than those with more education in both years.

The retention rate for those with three or more dependents was the highest of the dependent status groups in 1998. This pattern persisted in 2001 with those with three or more dependents having the highest retention rates as well as the highest increase in retention from 1998, 21.09 percentage points.

Retention rates were lowest for single personnel in both 1998 and 2001. Those married with a civilian spouse had the highest retention rate for both years with a dramatic increase of 22.84 percentage points from 1998 to 2001.

In both years the average age of stayers was greater than that of leavers. Personnel reenlisting in 2001 are older than those who reenlisted in 1998 and personnel leaving the service in 2001 was on average older than those who left in 1998. The average age of those personnel who reenlisted in 1998 sample was 23.79 years. The average age of personnel reenlisting in the 2001 sample was 24.27 years. The average age of personnel who left the service in 1998 was 23.68 years compared to those who left in 2001 which was 24.17 years.

Personnel on sea duty had a higher retention rate than those on shore duty in 1998. The retention rates were 39 percent and 28.51 percent, respectively. However, this was reversed in 2001 with those on sea duty having a reenlistment rate of 48.13 percent and those on shore duty having a reenlistment rate of 52.99 percent. The retention rates for personnel on shore duty increased dramatically in 2001 with a 24.48 percentage point increase from 1998. The retention rates for those stationed at sea increased by 9.13 percentage points between 1998 and 2001.

In 1998, 72.51 percent of personnel with a single deployment reenlisted. In 2001 this number decreased by 10.23 percentage points to 62.28 percent. Personnel with multiple deployments experienced an 8.77 percentage point decrease in reenlistments between 1998 and 2001. Nonetheless, personnel experiencing multiple deployments were more likely to reenlist in both years.

Though retention rates increased across all pay grades in 2001, the most dramatic increase was among the E5/E6 group which saw a 34.57 percentage point increase from 1998 to 2001. Retention rates were lowest for the E3 group and highest for the E5/E6 group in both years.

In 1998 Advanced X-ray Technicians and Psychiatry Technicians had the lowest retention rate among the different occupational specialties at 11.76 percent and 13.33 percent. In 2001 however, the lowest retention rates were among General Duty Corpsmen and Fleet Marine Force Corpsmen. The increase in retention rates was 68.24

percentage points for X-ray Technicians and 49.94 percentage points for Psychiatry Technicians. Though the retention rates increased for General Duty Corpsmen and Fleet Marine Force Corpsmen, the increases were much lower at 16.55 percentage points and 13 percentage points respectively.

C. METHODOLOGY

1. Theoretical Model

Multiple regression analysis is a valuable statistical technique for the estimation of retention models. In the logistic regression model, the dependent variable is a binary variable, where stay (=1) and leave (=0). The theoretical model is:

$$Li = \ln\left(\frac{Pi}{1-Pi}\right) = a + \beta xi$$

where:

Li -Is the log of the odds ratio

Pi -Is the probability that an individual reenlists, given the personal attributes Xi

a -Is the intercept parameter

β -Is the vector of slope parameters

Xi - is the vector of explanatory variables

2. Multivariate Logistic Regression Model

The empirical model used to find predicted probabilities of retention for first term Hospital Corpsmen is:

$$\begin{aligned} \ln\left(\frac{Pi}{1-Pi}\right) = & \beta_0 + \beta_1(FEMALE) + \beta_2(BLACK) + \beta_3(HISPANIC) \\ & + \beta_4(OTHERRACE) + \beta_5(SOMECOLLEGE) + \beta_6(DEPS1OR2) \\ & + \beta_7(DEPS3ORMORE) + \beta_8(ADSPOUSE) + \beta_9(CIVSPOUSE) \\ & + \beta_{10}(AGE) + \beta_{11}(SEA) + \beta_{12}(SINGLEDEPLOY) + \beta_{13}(MULTIPLEDEPLOY) \\ & + \beta_{14}(PG04) + \beta_{15}(PG05_06) + \beta_{16}(FMFHM) + \beta_{17}(SURGICALTECH) \\ & + \beta_{18}(PSYCHTECH) + \beta_{19}(ADVXRAY) + \beta_{20}(BSCXRAY) + \beta_{21}(PHARMACY) \\ & + \beta_{22}(LABTECH) + \beta_{23}(PMT) + \beta_{24}(OTHERNEC) \end{aligned}$$

The sign of the parameter estimate indicates whether the variable is associated with an increase or decrease in the probability of retention, and the predicted Wald Chi-

square Statistic determines if a given variable is significant at the usual levels of hypotheses testing. The chi-square statistic is derived by dividing the parameter estimate by its standard error and squaring the result. The probability of exceeding that statistic through random chance indicates whether the variable may be accepted or rejected for a given significance level.

Partial effects are evaluated using the notional person approach. The notional person approach defines a “typical” person to determine the overall retention probability. The change in probability associated with any given explanatory variable that is statistically significant can then be calculated for this “typical” person.

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IV. VARIABLE DEFINITIONS

A. DISCUSSION

As previously discussed, two categories of explanatory variables are used to evaluate the retention decision of first term enlisted Hospital Corpsmen. This section of the thesis describes the individual explanatory variables in each category along with the dependent variable. Finally, a summary of the explanatory variables and their expected effect on the dependent variable is presented.

1. Explanatory Variables Defined

a. Demographic Variables

(1) Gender (MALE, FEMALE). The gender variable is a dichotomous variable with two categories, male and female. The base case is MALE. Females are restricted in the types of duty they can perform and are less likely to be deployed or stationed at sea. These factors could positively or negatively influence a female's decision to remain in the service. If females view these restrictions as inequitable and unfair they would be more inclined to leave the service. However, if females value time at home with the immediate or extended family and have no desire to serve at sea or be deployed, then these factors could potentially increase their likelihood of remaining on active duty. The effect of the FEMALE variable could be either positive or negative.

(2) Race/Ethnic Group (WHITE, BLACK, HISPANIC, OTHERRACE). Race/ethnic group is described by four categories: WHITE, BLACK, HISPANIC and OTHERRACE. The base case is WHITE. The opportunity for training and advancement of minorities in the military is comparable to that of their white peers since all groups are afforded the same opportunities for advancement and skill training. On the other hand, minorities may not perceive the opportunities to be the same in the civilian sector which could translate into higher retention rates among minorities. As such, the expected effects of these three variables are positive.

(3) Education Level (HS, SOMECOLLEGE). The education level variable is expressed in two categories; high school diploma (HS) associates, bachelors or masters degree (SOMECOLLEGE). The base case is HS. Because enlisted

personnel are usually recruited out of high school and rely on the military to provide skills training, their propensity to find well paying jobs in the civilian sector is much lower than someone who has some form of college education. An individual with a college degree may perceive that there is a greater opportunity for employment in the civilian sector as well as an increased propensity for higher civilian wages and therefore may be more inclined to leave the military. The SOMECOLLEGE variable is expected to have a negative sign when compared to someone with a high school diploma.

(4) Dependents (NODEPS, DEPS1OR2, DEPS3ORMORE).

For the purpose of this thesis the dependent status of personnel in the data set was divided into three categories; no dependents (NODEPS), one or two dependents (DEPS1OR2) and three or more dependents (DEPS3ORMORE). The base case is NODEPS. Issues such as family separation may negatively influence the retention behavior of those personnel with dependents. However, the need to provide and care for the family could have a more significant impact on the decision to reenlist. Therefore, as the responsibilities associated with family life increases I expect an individual to reenlist for the benefits afforded the family and job security and therefore expect the DEPS1OR2 and DEPS3ORMORE variables to have positive signs.

(5) Marital Status (SINGLE, ADSPOUSE, CIVSPOUSE).

The marital status variable was divided into three categories: SINGLE, ADSPOUSE and CIVSPOUSE. The base case is SINGLE. As the responsibilities associated with family life increase sailors are expected to be more career focused and aspire to greater job security. However, given the rigors of military life and the possibility of deployments and sea duty, I would expect an individual with a military spouse to be less inclined to stay in the military. As such, the ADSPOUSE variable is expected to have a negative sign and the CIVSPOUSE variable is expected to have a positive effect on the dependent variable.

(6) Current Age (AGE). The current age variable is a continuous variable that represents the age of an individual as of September 1, 1998 or September 11, 2001. As an individual ages in the service, the propensity for advancement, advanced training and higher wages increase. Additionally, the older an

individual becomes the more likely they are to marry and start a family, therefore increasing the importance of job stability and benefits. As such, this variable is expected to have a positive sign.

b. Military Experience Variables

(1) Duty Type (SEA, SHORE). The duty type variable is divided into two categories: SEA and SHORE. The base case is SHORE. Personnel currently stationed at sea are expected to reenlist at a lower rate. These personnel often spend a great deal of time away from family, work longer hours and are often unable to pursue off duty education. I expect the SEA variable to have a negative sign.

(2) Deployment Status (NODEPLOY, SINGLEDEPLOY, MULTIPLEDEPLOY). The deployment behavior of personnel is described by three categories; no deployments (NODEPLOY), one deployment (SINGLEDEPLOY), and multiple deployments (MULTIPLEDEPLOY). The base case is NODEPLOY. Personnel who spend a great deal of time in a deployment status are expected to reenlist at a lower rate. The variables SINGLEDEPLOY and MULTIPLEDEPLOY are expected to have a negative effect compared with the base case. However, based on the literature review, previous studies have shown mixed results for the effect of deployments on reenlistment. Kirby and Naftel (1998) concluded that mobilizations had no apparent effect on reenlistment however; Cooke, Marcus & Quester (2002) concluded that long deployments have a negative effect on reenlistment for first term sailors. Hosek (2002) determined that hostile deployments had little effect on reenlistment of first term sailors.

(3) Pay Grade (PG03, PG04, PG05_PG06). Pay grade is described by three categories; pay grade E3 (PG03), pay grade E4 (PG04) and pay grades E5/E6 (PG05_PG06). The base case is PG03. The longer an individual remains in the service the more opportunity he or she has for advancement. An individual receives higher monetary wages and benefits as he or she advances to the next higher pay grade. Higher wages are an incentive for an individual to remain in the service and therefore the PG04 and the PG05_PG06 variables are expected to have a positive effect.

(4) Occupational Specialty (GENHM, FMFHM, SURGICALTECH, PSYCHTECH, ADVXRAY, BSCXRAY, PHARMACY, LABTECH, PMT, OTHERNEC). The occupational specialty variable is divided into ten categories:

General Duty Corpsman (GENHM), Fleet Marine Force Corpsman (FMFHM), Surgical Technician (SURGICALTECH), Psychiatry Technician (PSYCHTECH), Advanced X-ray Technician (ADVXRAY), Basic X-ray Technician (BSCXRAY), Pharmacy Technician (PHARMACY), Laboratory Technician (LABTECH), Preventive Medicine Technician (PMT) and other technical specialties not represented above (OTHERNEC). The base case is GENHM. The effects of the seven technical specialty variables could be either positive or negative compared to the base case. Once an individual receives advanced training, the probability of finding a good civilian job increases as well as the opportunity for higher civilian wages. In addition, these individuals can obtain certifications and licenses that are useful in the civilian workforce which could potentially lead to an individual leaving the service. On the other hand, these individuals sometimes receive incentive bonuses and advancement incentives to remain in the service. Additionally, these individual are less likely to be assigned to sea duty and have a lower likelihood of deployments which could entice them to remain in the service.

Though General Duty Corpsmen are assigned to ships and face routine and unplanned deployments, Fleet Marine Force Corpsmen are more likely to be deployed in support of special operations and with ground combat units. Fleet Marine Force Corpsmen are subject to harsh living conditions when deployed which are usually not experienced by those General Duty Corpsmen assigned to ships. In addition, Fleet Marine Force Corpsmen are more likely to be in a hostile environment and more likely to be in the line of fire. The expected sign of the FMFHM variable is negative when compared to the base case, GENHM.

2. Dependent Variable (STAY)

The dependent variable for this thesis is dichotomous. If an individual was on active duty in September 1998 and reenlisted prior to September 2001 or an individual was on active duty on September 11, 2001 and reenlisted prior to March 31, 2004 the variable STAY takes on a value of 1 and the individual is considered a stayer. If the individual separated from active duty during either period, the variable STAY takes on a value of 0 and the individual is considered a leaver.

Table 4.1 presents a summary of the explanatory variables and their expected effect on the dependent variable.

Table 4.1 Explanatory Variables and Expected Signs

Variable Name	Variable Type	Expected Sign
Demographic		
Gender		
MALE	Dichotomous	Base Case
FEMALE	Dichotomous	+/-
Race/Ethnic		
WHITE	Dichotomous	Base Case
BLACK	Dichotomous	+
HISPANIC	Dichotomous	+
OTHERRACE	Dichotomous	+
Education Level		
HS	Dichotomous	Base Case
SOMECOLLEGE	Dichotomous	-
Dependents		
NODEPS	Dichotomous	Base Case
DEPS1OR2	Dichotomous	+
DEPS3ORMORE	Dichotomous	+
Marital Status		
SINGLE	Dichotomous	Base Case
ADSPOUSE	Dichotomous	-
CIVSPOUSE	Dichotomous	+
Current Age		
AGE	Continuous	+
Military Experience		
Duty Type		
SHORE	Dichotomous	Base Case
SEA	Dichotomous	-
Deployment Status		
NODEPLOY	Dichotomous	Base Case

SINGLEDEPLOY	Dichotomous	-
MULTIPLEDEPLOY	Dichotomous	-
Pay grade		
PG03	Dichotomous	Base Case
PG04	Dichotomous	+
PG05_PG06	Dichotomous	+
Occupational specialty		
GENHM	Dichotomous	Base Case
FMFHM	Dichotomous	-
SURGICALTECH	Dichotomous	+/-
PSYCHTECH	Dichotomous	+/-
ADVXRAY	Dichotomous	+/-
BSCXRAY	Dichotomous	+/-
PHARMACY	Dichotomous	+/-
LABTECH	Dichotomous	+/-
PMT	Dichotomous	+/-
OTHERNEC	Dichotomous	+/-

Source: Author

V. RESULTS OF THE ANALYSIS

A. DISCUSSION

Initially the cross-sectional data for 1998 and 2001 were pooled and a single logistic regression model was estimated that included the variables discussed in Chapter III as well as an indicator variable for year of enlistment eligibility. The result for this pooled model indicated that year of reenlistment eligibility was significant. A chow test was subsequently conducted and the results indicated that separate models were appropriate for each year in order to analyze the data accurately. Further, in an attempt to improve the functional form of the initial model, a squared term of the age variable (agesq) was added to the regression models. The new variable was significant in the 1998 data set but not significant in the 2001 data set. As such, the variable agesq was retained in the 1998 data set but not the 2001 data set.

B. RESULTS – 1998 MODEL

1. Goodness of Fit

a. Global Null Hypotheses Test

Several criteria can be employed to assess the overall goodness of fit of the model. The first utilizes the Log Likelihood Ratio. This statistic has a chi-square distribution and is used to test the null hypothesis that all coefficients in the model are zero. A significant probability value ($P \leq .05$) indicates that at least one of the coefficients for an explanatory variable is not zero. If the null hypothesis is rejected we can conclude that at least one of the betas equals zero and therefore the model has a good fit and some explanatory power. The global null hypotheses test results shown in Table 5.1 indicate that the 1998 model is significantly better at the .01 level than a model consisting of only the intercept and has a good fit.

Table 5.1 Global Null Hypothesis Test for 1998 Regression Model

Model Fit Statistics			
	Criterion	Intercept	Intercept/Covariates
	-2 Log L	5409.411	4834.364
Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	575.0462	27	<.0001

Source: Author

b. R-Square

A second criterion for goodness of fit uses the Generalized R-square and Max-rescaled R square. The R-square indicates the percent of the variation in the dependent variable that is explained by all of the explanatory variables. A possible drawback of the generalized R-square is that its upper limit is less than one because the dependent variable is discrete. To fix this, the Max-rescaled R-square is used. The Max-rescaled R-square divides the generalized R-square by its upper limit. The Max-rescaled R-square for the model is .1742 indicating that 17.42 percent of the variation in the dependent variable is explained by all of the explanatory variables. This low R-square is not unusual given the use of logistic regression and cross-sectional data and suggests that there are variables not included in the model that are important in explaining retention behavior. Variables such as unemployment rate, propensity to find a good civilian job, satisfaction with military life, and educational benefits, among others, were not available for use in the model but would contribute useful information in explaining retention behavior. Given the low R-square and Max-rescaled R-square we can conclude that the model has limited predictive ability for retention behavior.

Table 5.2 R-Square and Max-rescaled R-Square for 1998 Regression Model

R-Square	Max-rescaled R-Square
0.1241	0.1742

Source: Author

c. *Classification Table*

The ability of a model to correctly classify stayers and “leavers” accurately provides some indication of its usefulness. When the actual outcome and predicted outcome are the same, the prediction is deemed accurate. The “sensitivity” and “specificity” provides some insight into the predictive accuracy of the model. Sensitivity is the ratio of the number of stayers correctly classified as stayers while specificity is the ratio of leavers correctly classified as leavers. To determine the desired probability levels for classifying stayers, the actual retention rate of the samples were used which was .3152 for the 1998 sample and .5162 for the 2001 sample. These actual retention rates were used as a cutoff point to determine classification percentages for the classification table.

As shown in Table 5.3, the 1998 model correctly predicted the retention of 69.4 percent of those Hospital Corpsmen, based on a cutoff probability of .320. This suggests that the model is useful in predicting retention behavior since it correctly classifies almost 70 percent of the observations. The “sensitivity” results for the model shows that 49.1 percent of those Hospital Corpsmen who reenlisted are accurately classified while “specificity” results indicate correct classification of 78.8 percent of those who separated.

Table 5.3. Classification Table for 1998 Regression Model

	Correct		Incorrect			Percentages			
Prob Level	Event	Non- Event	Event	Non- Event	Correct	Sensi- tivity	Speci- ficity	False Pos	False Neg
.320	672	2341	631	696	69.4	49.1	78.8	48.4	22.9

Source: Author

2. Interpretation and Evaluation of Coefficients

Of the 27 explanatory variables used in the 1998 first term model, 17 are statistically significant as indicated in Table 5.4. The results shown are for a one tailed test with the exception of the variables FEMALE, SURGICALTECH, ADVXRAY, BSCXRAY, PHARMACY, LABTECH, PMT, PSYCHTECH and OTHERNEC.

Table 5.4. Logistic Regression Results 1998 N=4340

Variables	Parameter Estimates	Pr > Chisq
INTERCEPT	3.6646	0.0347
FEMALE	-0.0429	0.6365
BLACK***	0.6374	<.00005
HISPANIC**	0.2189	0.02315
OTHERRACE***	0.6921	<.00005
SOMECOLLEGE**	-0.4025	0.0330
SEA_NODEPLOY***	0.4222	<.00005
SEA_SINGLEDEPLOY***	2.3440	<.00005
SEA_MULTIPLEDEPLOY***	2.8265	<.00005
SHORE_SINGLEDEPLOY***	2.0234	<.00005
SHORE_MULTIPLEDEPLOY***	2.5435	<.00005
DEPS1OR2***	0.3967	0.0002
DEPS3ORMORE***	0.8185	<.00005
PG04*	0.1325	0.05385
PG05_06	0.1396	0.27655
ADSPOUSE**	0.2224	0.03165
CIVSPOUSE*	-0.1716	0.07475
FMFHM	-0.0238	0.40435
SURGICAL TECH**	-0.4969	0.0209
ADVXRAY	-1.1203	0.1485
BSCXRAY*	0.4486	0.0765
PHARMACY	-0.0108	0.9585
LABTECH	0.2283	0.2630
PMT	0.5067	0.1229
PSYCHTECH***	-1.0745	0.0084
OTHERNEC	0.1723	0.2091
AGE***	-0.3920	0.00125
AGESQ***	0.00770	0.00065

*** Significant at .01 level

** Significant at .05 level

* Significant at .10 level

Source: Author

The FEMALE variable is not significant in the model indicating that one's gender does not affect the decision to reenlist or leave the service. It is possible that male and female Hospital Corpsmen view their military experiences in the same way and are therefore influenced by similar factors when weighing the reenlistment decision.

A test for joint significance indicated that the race/ethnic variables were jointly significant and that minority race/ethnic group membership significantly affects retention. The race/ethnic variables BLACK and OTHERRACE are significant at the one percent level and positive. The variable HISPANIC is significant at the five percent level and also has a positive sign. A possible explanation is that minorities in the service see themselves as having more opportunities equal to those of their white peers. The opportunity for training and advancement of minorities in the military may be perceived as comparable to that of whites. Minorities may not perceive their opportunities to be as great in the civilian sector and are therefore more inclined to remain in the service.

The education level variable is significant in the model but negative. This suggests that personnel with more than a high school education are less likely to reenlist than those who possess only a high school diploma. The negative sign was expected because personnel with a college education often feel that they are more marketable in the civilian community. Additionally, they think they can more readily find a civilian job as well as receive higher wages and compensation which increases the incentive to leave the service.

The deployment variables are significant at the one percent level and positive. A test for joint significance also indicated that they were jointly significant in the model (see Table 5.9). This indicates that personnel stationed at sea who are deployed or non-deployed as well as those stationed at a shore facility and have been deployed are more likely to remain in the service than someone who is assigned to shore duty and has no deployments. This could indicate that personnel who deploy may view deployments as a necessary part of life in the military and may find deployments more rewarding and in keeping with their military expectations. Additionally, some personnel may view their role in the military solely as that of defending the United States of America and therefore may become more patriotic during periods of war or unrest and more eager to serve

during those times. This finding is not surprising since the literature shows that in some cases, reenlistments have been shown to increase during periods of conflict and during periods of increased deployments.

The dependent status variables are both significant at the .01 level and have positive signs. This indicates that a person who has dependents other than a spouse, regardless of the number is more likely to remain in the service than someone who has no dependents (other than spouse). This finding is as expected since increased family responsibilities prioritize the importance of job security and the benefits afforded the family and therefore are likely to influence a service member to remain in the service.

The PG04 variable is significant at the .10 level and positive. This indicates that personnel at the rank of E-4 are more likely to remain in the service than those who are at the rank of E-3. The positive sign is expected because, as individuals advance in rank they are more likely to receive advanced training, their pay increases and often family responsibilities increase. The PG05_06 variable is not significant in the model. The lack of significance of the PG05_06 variable is surprising. As service members advance up the ranks it is expected that their likelihood of remaining in the service increases. The fact that this pay grade has no effect on the reenlistment decision may reflect the fact that first term sailors have not been in the military long enough to view promotion within the military ranks as significant. Additionally, very few sailors advance to the ranks of E-5 and E-6 during their first enlistment. The limited numbers of personnel reflected in the sample may not be enough to produce a true test of the effect.

The active duty spouse variable is significant in the model and positive while the civilian spouse variable is significant and negative. This is unusual as I would expect the signs to be reversed for both variables. When a service member is married to another service member it is believed that this increases the likelihood of leaving the service. The fact that the effect is positive might suggest that the security of a second income could be an influential factor as well as the Navy's policy to avoid deployment of both service members at the same time or assignment to sea duty at the same time. The negative sign associated with the civilian spouse variable may suggest that the effect of family separation may be weighed very heavily by some service members and may be far more

important than job security or other factors that might influence one to remain in the service. In addition, the employment opportunities and career of the service members spouse may weigh heavily when making a decision to stay or leave the military.

The occupational specialty variables FMFHM, ADVXRAY, PHARMACY, LABTECH, PMT and OTHERNEC are not significant in the model. A test for joint significance indicated they were jointly significant and therefore all belonged in the model (see table 5.8). The SURGICALTECH variable is significant at the .05 level, BSCXRAY at the .10 and PSYCHTECH at the .01 level. The SURGICALTECH, and PSYCHTECH variables have negative signs, suggesting that someone in either of these occupational specialties is less likely to remain in the service than a General Duty Corpsman. This may be attributed to the fact that these three specialties can obtain certifications that are useful in the civilian sector as well as imply a need for these specialties in the civilian labor market which could make it easy to find civilian employment. On the other hand, the variable BSCXRAY has a positive sign and is significant suggesting that a Basic X-ray Technician is more likely to remain in the service than a General Duty Corpsman. In order to obtain certifications applicable to the civilian sector, X-ray Technicians must receive advanced training. It is possible that Basic X-ray Technicians remain in the service so they can receive the advanced training required to be marketable in the civilian sector.

A test for joint significance indicated that both the age and age squared variables were jointly significant and therefore useful in the model. The age variable is significant in the model and has a negative sign while the age square variable is significant and has a positive sign. The negative and positive signs indicate that age has a negative effect on retention to a point after which the effect becomes positive. In order to determine the point at which the effect of age becomes positive the predicted values of age (β_1) and age square (β_2) were used in the following equation: $\beta_1 \div 2(\beta_2) = .392 \div 2(.0077) = 25.45$. I can conclude that the effect of age on retention is negative until an individual reaches 25.45 years at which time the effect becomes positive. It is possible that at this cut off point of 25.45 years, individuals are assuming more

responsibility for their careers, are more serious about family, are advancing up the ranks and are looking for more stability in their professional lives.

3. Significant Variables and Partial Effects

a. Notional Person

The notional person method is used to evaluate the partial effect of a single explanatory variable on the probability of retention. This is done by setting all the explanatory variables to their mean values if they are continuous (AGE=23.77) and to zero in the case of dummy variables (all other variables in the model). Each variable is independently tested by increasing it by one and the partial effect of that variable on the probability of reenlistment is gauged by subtracting the result of this change from the probability of reenlistment of the “notional person” (base case).

According to the 1998 model results, there is a 17.89 percent chance that the “notional person” will reenlist. The notional person is a white male, E-3, who is stationed at a shore facility and has not been deployed. He is 23.77 years old, has no college degree, is single with no dependents and is a General Duty Hospital Corpsman.

b. Partial Effects

Table 5.5 shows the partial effects and significance levels for those variables that are significant in the Logit Model. The notional person has a 17.89 percent likelihood of reenlisting. For someone with the same characteristics of the notional person except that he is black, the retention rate increases by 10.11 percentage points. If the individual has the same characteristics as the notional person but is Hispanic or of another race, the retention rate increases by 5.38 percentage points and 15.93 percentage points respectively.

For someone similar to the notional person except that he has some type of college degree, the probability of reenlistment decreases by 6.39 percentage points. For a person similar to the notional person except that he is stationed at sea and has not been deployed, is stationed at sea and has been deployed once or is stationed at sea and has been deployed on multiple occasions, the probability of reenlistment increases by 1.27, 23.47 and 33.93 percentage points respectively. Similarly, an individual with the same characteristics as the notional person except that he is stationed at a shore facility and has

been deployed once or stationed at a shore facility and has been deployed multiple times the probability of reenlisting increases by 34.38 and 49.34 percentage points respectively.

For someone similar to the notional person except that he has one or two dependents as opposed to no dependents, the probability of reenlistment increases by 3.61 percentage points. If the number of dependents increases to three or more, the probability of reenlisting increases by .006 percentage points to 4.21 percentage points.

For an individual with the same characteristics as the notional person except that his pay grade is E-4, rather than E-3 the probability of reenlisting increases by 9.44 percentage points. For someone similar to the notional person except that he is married with an active duty spouse or married with a civilian spouse, the probability of reenlisting increases by 2.11 and 0.18 percentage points compared with a person who is not married.

For someone similar to the notional person but whose occupational specialty is Surgical Technician or Psychiatry Technician, the probability of reenlisting decreases by 3.22 and 0.9 percentage points respectively. If the occupational specialty is Basic X-ray Technician, the probability of reenlisting increases by 15.65 percentage points compared to an individual who is a General Duty Corpsman.

If the current age of the Corpsman is greater by one year than the notional person, the probability of reenlisting increases by 0.42 percentage points. Table 5.5 shows the partial effects and significance levels for those variables that are significant in the Logit Model.

Table 5.5. Partial Effects 1998 Logit Model

Variables	Partial Effect
BLACK***	+.1011
HISPANIC**	+.0538
OTHERRACE***	+.1593
SOMECOLLEGE*	-.0639
SEA_NODEPLOY***	+.0128
SEA_SINGLEDEPLOY***	+.2347
SEA_MULTIPLEDEPLOY***	+..3393
SHORE_SINGLEDEPLOY***	+.3438
SHORE_MULTIPLEDEPLOY***	+.4934
DEPS1OR2***	+.0361
DEPS3ORMORE***	+.0421
PG04*	+.0945
ADSPOUSE**	+.0211
CIVSPOUSE*	+.0018
SURGICAL TECH**	-.0322
BSCXRAY*	+.1565
PSYCHTECH***	-.009
AGE***	+.0042

*** Significant at .01 level

** Significant at .05 level

* Significant at .10 level

Source: Author

4. Restricted Model Tests

The restricted model test is used to determine whether or not a group of variables are jointly useful in a model. The family status variables, pay grade, occupational specialties, deployment status, race/ethnic and age variables were tested to determine if they were jointly significant in the model. Tables 5.6 through 5.11 shows the results for each group tested.

A test for joint significance showed that the family status variables (ADSPOUSE, CIVSPOUSE, DEPS1OR2, and DEPS3ORMORE) were jointly significant at the .01 level in the model. This indicates that these variables together are significant in the model and that family status is useful in helping to predict retention behavior. Table 5.6 shows the values associated with the joint significance test.

Table 5.6. 1998 Model Joint Significance Test for Family Status

Wald Chi-Square	DF	Pr > ChiSq
31.0365	4	<.0001

Source: Author

A test for joint significance shows that the pay grade variables are not significant in the model. Since pay grade is one of those variables inherent to the military and is related to important issues such as pay, eligibility for training, and positions held, it has theoretical importance in the retention model. Some of the effects of the pay grade variable may be captured in family status and age which could explain its lack of significance. The literature shows that pay grade is important in military retention studies, therefore the pay grade variables were retained in the model (Hogan & Black, 1991; Warner & Goldberg, 1984; Weiss et al., 2002). Table 5.7 shows the values associated with the joint significance test.

Table 5.7. 1998 Model Joint Significance Test for Pay Grade

Wald Chi-Square	DF	Pr > ChiSq
2.5999	2	.2725

Source: Author

The occupational specialty variables proved to be jointly significant at the .01 level. This indicates that these variables together are significant in the model and that occupation is useful in helping to predict retention behavior. Table 5.8 shows the values associated with the joint significance test.

Table 5.8. 1998 Model Joint Significance Test for Occupational Specialty

Wald Chi-Square	DF	Pr > ChiSq
24.4643	9	0.0036

Source: Author

The deployment status variables also proved to be jointly Significant at the .01 level. This indicates that deployment characteristics together are significant in the model and are useful in helping to predict retention behavior. Table 5.9 shows the values associated with the joint significance test.

Table 5.9. 1998 Model Joint Significance Test for Deployment Status

Wald Chi-Square	DF	Pr > ChiSq
338.785	5	<.0001

Source: Author

Minority race/ethnic group membership proved to be significant at the .01 level in a restricted model test. This indicates that these variables together are significant in the model and are useful in helping to predict retention behavior. Table 5.10 shows the values associated with the joint significance test.

Table 5.10. 1998 Model Joint Significance Test for Race/Ethnic Status

Wald Chi-Square	DF	Pr > ChiSq
61.2751	3	<.0001

Source: Author

The age variables (age and age squared) proved to be significant at the .01 level. This indicates that age is significant in the model and useful in helping to predict retention behavior. Table 5.11 shows the values associated with the joint significance test.

Table 5.11. 1998 Model Joint Significance Test for Current Age

Wald Chi-Square	DF	Pr > ChiSq
12.7647	2	0.0017

Source: Author

5. Potential Problems with the 1998 Model

Multicollinearity can undermine the statistical integrity of the model. Multicollinearity in regression models is a result of strong correlations between independent variables. The existence of multicollinearity inflates the variances of the parameter estimates. That may result, particularly for small and moderate sample sizes, in lack of statistical significance of individual independent variables while the overall model may be strongly significant. Multicollinearity may also result in incorrect signs and magnitudes of regression coefficient estimates, and consequently in incorrect conclusions about relationships between independent and dependent variables. The Variance Inflation Factor (VIF) is used to detect multicollinearity. There is no formal cutoff value to use with VIF for determining presence of multicollinearity. Values of VIF exceeding 10 are often regarded as indicating multicollinearity, but in weaker models, which is often the case in logistic regression, values above 2.5 may be a cause for concern (see, P.D. Allison, *Logistic Regression Using the SAS System*, SAS Institute, 1999).

Another approach is to compare VIFs for individual models with the model VIF. The model VIF is calculated using the following equation: $1 \div (1 - R\text{-square}) = 1 \div (1 - .1361) = 1.1503$. The issue of multicollinearity was a concern in this model particularly among the Deployment and duty type variables. To address the problem, new variables were created that captured the interaction between these variables. In the initial model the variables SEA and SHORE represented the duty types while the deployment variables were represented by NODEPLOY, SINGLEDEPLOY and MULTIPLEDEPLOY. To address the problem of multicollinearity these variables were combined (SEA_NODEPLOY, SEA_SINGLEDEPLOY, SEA_MULTIPLEDEPLOY, SHORE_NODEPLOY, SHORE_SINGLEDEPLOY AND SHORE_MULTIPLEDEPLOY). The end result was an improved model indicated by a

higher R-Square and elimination of correlation that existed among the initial variables as well as others. Table 5.10 presents the results of the test for multicollinearity in the 1998 model.

Table 5.12 Test for Multicollinearity in the 1998 Model
Model VIF=1.1503

Variables	Parameter Estimates	VIF
INTERCEPT	1.12369	0
FEMALE*	-0.00746	1.47925
BLACK	0.12452	1.13356
HISPANIC	0.04037	1.06288
OTHERRACE	0.13841	1.06785
SOMECOLLEGE	-0.06790	1.13960
SEA_NODEPLOY*	0.08165	1.36873
SEA_SINGLEDEPLOY	0.50927	1.09704
SEA_MULTIPLEDEPLOY	0.59256	1.02603
SHORE_SINGLEDEPLOY	0.44938	1.04566
SHORE_MULTIPLEDEPLOY	0.54145	1.01735
DEPS1OR2*	0.07632	2.34230
DEPS3ORMORE*	0.16079	1.51377
PG04*	0.2438	1.21305
PG05_06*	0.2376	1.15180
ADSPOUSE*	0.4296	1.15057
CIVSPOUSE*	-0.3335	2.64170
FMFHM*	-0.0282	1.77851
SURGICAL TECH	-0.08230	1.07600
ADVXRAY	-0.14974	1.03808
BSCXRAY*	-0.16049	1.01889
PHARMACY	0.08917	1.05082
LABTECH	-0.00178	1.07357
PMT	0.04249	1.08621

PSYCHTECH	0.10251	1.03496
OTHERNEC*	0.03269	1.24457
AGE*	-0.07658	112.83385
AGESQ*	0.00151	111.49607

* Variable VIF higher than model VIF

Source: Author

Omitted variable bias is a potential problem for the predictive usefulness of the 1998 model. The low Max rescaled R-square (.1742) associated with the model is an indicator that there are variables omitted from the model which could be useful in explaining retention behavior. The literature review indicates that omitted variables such as unemployment rate, propensity to find a good civilian job, satisfaction with military life, educational benefits among others are often used in retention studies and are useful in explaining retention behavior model (Hogan & Black, 1991; Warner & Goldberg, 1984). Their addition, if such data were available could improve the model.

C. RESULTS – 2001 MODEL

1. Goodness of Fit

a. *Global Null Hypotheses Test*

The global null hypotheses test shown in Table 5.13 indicates that the 2001 model is significantly better at the .01 level than a model consisting of only the intercept and has a good fit.

Table 5.13 Global Null Hypothesis Test for 2001 Logistic Regression Model

Model Fit Statistics			
	Criterion	Intercept	Intercept/Covariates
	-2 Log L	4478.479	4121.310
Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	357.1694	26	<.0001

Source: Author

b. R-Square

The max-rescaled R-square as shown in Table 5.14 was .1395 indicating that 13.95 percent of the variation in the dependent variable is explained by each of the explanatory variables. Given the low R-square and Max-rescaled R Square we can conclude that the model has limited predictive ability in determining retention behavior.

Table 5.14 R-Square and Max-rescaled R-Square for 2001 Logistic Regression Model

R-Square	Max-rescaled R-Square
.1046	0.1395

Source: Author

c. Classification Table

The actual retention rate of the 2001 sample was 51.62 percent. As shown in Table 5.15, the 2001 model correctly predicted 61.6 percent of those Hospital Corpsmen who reenlisted at the .520 probability level thereby suggesting that the model is somewhat useful in predicting retention behavior. The “sensitivity” results for the model shows that 54.9 percent of those Hospital Corpsmen who reenlisted are accurately classified while “specificity” results indicate correct classification of 68.7 percent of those who separated.

Table 5.15 Classification Table for 2001 Logistic Regression Model

	Correct		Incorrect			Percentages			
Prob Level	Event	Non-Event	Event	Non-Event	Correct	Sensitivity	Specificity	False Pos	False Neg
.520	917	1074	490	752	61.6	54.9	68.7	34.8	41.2

Source: Author

2. Interpretation and Evaluation of Coefficients

Of the 26 explanatory variables used in the 2001 first term model, 20 are statistically significant as indicated in Table 5.16:

Table 5.16 Logistic Regression Results 2001 N=3233

Variables	Parameter Estimates	Pr > Chisq
INTERCEPT	-2.1915	0.0083
FEMALE***	0.0643	0.0081
BLACK***	0.5794	<0.00005
HISPANIC*	0.3309	0.0802
OTHERRACE***	0.8526	<0.00005
SOMECOLLEGE**	-0.5173	0.0295
SEA_NODEPLOY**	0.0847	0.01385
SEA_SINGLEDEPLOY**	1.1748	0.0467
SEA_MULTIPLEDEPLOY***	1.5966	0.00055
SHORE_SINGLEDEPLOY***	1.6147	<0.00005
SHORE_MULTIPLEDEPLOY***	2.2425	<0.00005
DEPS1OR2*	0.2289	0.06885
DEPS3ORMORE***	0.2640	0.00075
PG04***	0.5463	<0.00005
PG05_06***	1.5103	<0.00005
ADSPOUSE	0.1376	0.2651
CIVSPOUSE	0.0123	0.1777
FMFHM	0.2467	0.1857
SURGICAL TECH	-0.2368	0.1533
ADVXRAY	-0.4498	0.3311
BSCXRAY***	0.8399	<0.0001
PHARMACY***	0.2541	0.0005
LABTECH**	0.2022	0.0253
PMT***	0.7872	<0.0001
PSYCHTECH**	-0.0626	0.0375
OTHERNEC***	0.2833	0.0002
AGE	0.0281	0.3175

*** Significant at .01 level

** Significant at .05 level

* Significant at .10 level

Source: Author

The FEMALE variable is significant in the model and positive. The positive sign is unexpected, however, this could indicate that females are becoming more comfortable with military life and have developed a greater sense of patriotism than their male counterparts.

The race/ethnic variables BLACK and OTHERRACE are significant at the one percent level and positive. The HISPANIC variable is significant at the .10 level and positive. Positive signs were expected for all three variables.

The education level variable is significant at the .05 level and has a negative sign as expected. This suggests that personnel with a college degree are less likely to reenlist.

The deployment variables are significant at the one percent level and positive with the exception of the SEA_NODEPLOY and SEA_SINGLEDEPLOY variables which are significant at the .05 level and also positive. This indicates that personnel stationed at sea who are deployed or non-deployed as well as those stationed at a shore facility and have been deployed are more likely to remain in the service than someone who is assigned to shore duty and has no deployments.

The dependent status variables are both significant in the model and have positive signs. This indicates that a person who has dependents other than a spouse, regardless of the number of dependents, is more likely to remain in the service than someone who has no dependents other than a spouse.

The pay grade variables are all significant at the .01 level. The longer an individual remains in the service the more likely he or she is to be promoted. As service members advance within the ranks, it is anticipated that the likelihood of reenlisting will increase.

The civilian spouse variable and active duty spouse variables are not significant in the model. This indicates that one's marital status is not a factor in predicting retention behavior.

The occupational specialty variables FMF, SURGICALTECH and ADVXRAY are not significant in the model. All other occupational specialties (BSCXRAY, PHARMACY, LABTECH, PMT, PSYCHTECH, and OTHERNEC) are significant in the

model and positive. This indicates that someone in any of these occupational groups is more likely to remain in the service than an individual who is a General Duty Hospital Corpsmen

The age variable is not significant in the model which suggests that age is not a factor that influences reenlistment decisions. This is unexpected because as an individual age in the service, the opportunity for promotion, higher wages and training increases. The probability of getting married and starting a family also increases which are all factors that would influence an individual to remain in the service. Collinearity with these variables may be responsible for the low significance of age in this model.

3. Significant Variables and Partial Effects

a. Notional Person

According to the 2001 model results there is an 18.11 percent chance that the “notional person” will reenlist. The notional person is a white male, E-3, who is stationed at a shore facility and has not been deployed. He is 24.31 years old, has no college degree, is single with no dependents and is a General Duty Hospital Corpsman.

b. Partial Effects

The notional person has an 18.11 percent likelihood of reenlisting. For someone with the same characteristics as the notional person except that she is female, the promotion rate increases by .97 percentage points. For someone with the same characteristics as the notional person except that he is black, the promotion rate increases 10.19 percentage points. If the individual has the same characteristics as the notional person but is Hispanic or of another race the promotion rate increases by 5.43 and 16.05 percentage points respectively. For someone similar to the notional person except that he has some type of college degree, the probability of reenlistment decreases by 6.45 percentage points compared to an individual with a high school diploma.

For someone similar to the notional person except that he is stationed at sea and has not been deployed, is stationed at sea and has been deployed once or is stationed at sea and has been deployed on multiple occasions the probability of reenlistment increases by 1.29 23.62 and 34.08 percentage points respectively. Similarly, an individual with the same characteristics as the notional person except that he is stationed at a shore facility and have been deployed once or is stationed at a shore

facility and has been deployed multiple times the probability of reenlisting increases by 34.53 and 49.45 percentage points respectively.

For an individual who is similar to the notional person except that he has one or two dependents as opposed to no dependents, the probability of reenlistment increases by 3.65 percentage points. If the number of dependents increases to three or more, the probability of reenlisting increases by .06 percentage points to 4.25 percentage points.

For an individual with the same characteristics as the notional person except that his pay grade is E-4, rather than E-3 the probability of reenlisting increases by 9.53 percentage points. If the individual is in pay grades E-5 or E-6 the probability of reenlisting increases by 31.93 percentage points compared to an individual who is in pay grade E-3.

For someone similar to the notional person whose occupational specialty is Basic X-ray Technician or Pharmacy Technician, the probability of reenlisting increases by 15.74 and 4.08 percentage points respectively. If the occupational specialty is Laboratory Technician or Preventive Medicine Technician, the probability of reenlisting increases by 3.20 and 14.59 percentage points. If the occupational specialty is the variable OTHERNEC, the probability of reenlisting increases by 4.59 percentage points. If the occupational specialty is Psychiatry Technician, the probability of reenlisting decreases 0.91 percentage points. Table 5.17 shows the partial effects and significance levels for those variables that are significant in the Logit Model.

Table 5.17. Partial Effects 2001 Logit Model

Variables	Partial Effect
FEMALE***	+.0097
BLACK***	+.1019
HISPANIC*	+.0543
OTHERRACE***	+.1605
SOMECOLLEGE**	-.0645
SEA_NODEPLOY**	+.0129
SEA_SINGLEDEPLOY**	+.2362
SEA_MULTIPLEDEPLOY***	+.3408
SHORE_SINGLEDEPLOY***	+.3453
SHORE_MULTIPLEDEPLOY***	+.4945
DEPS1OR2*	+.0565
DEPS3ORMORE***	+.0425
PG04***	+.0953
PG05_06***	+.3193
BSCXRAY***	+.1574
PHARMACY***	+.0408
LABTECH**	+.0320
PMT***	+.1459
PSYCHTECH**	-.0091
OTHERNEC***	+.0459

*** Significant at .01 level

** Significant at .05 level

* Significant at .10 level

Source: Author

4. Restricted Model Tests

The family status variables, pay grade, occupational specialties, deployment status, and race/ethnic variables were tested to determine if they were jointly significant in the model. Tables 5.18 through 5.22 shows the results for each group tested.

A test for joint significance showed that the family status variables (ADSPOUSE, CIVSPOUSE, DEPS1OR2, and DEPS3ORMORE) were jointly significant at the .01 level in the model. This indicates that these variables together are significant in the model and that family status is useful in helping to predict retention behavior. Table 5.18 shows the values associated with the joint significance test.

Table 5.18. 2001 Model Joint Significance Test for Family Status

Wald Chi-Square	DF	Pr > ChiSq
24.7569	4	<.0001

Source: Author

A test for joint significance shows that the pay grade variables are significant at the .01 level. This indicates that these variables together are significant in the model and that pay grade is useful in helping to predict retention behavior. Table 5.19 shows the values associated with the joint significance test.

Table 5.19 2001 Model Joint Significance Test for Pay Grade

Wald Chi-Square	DF	Pr > ChiSq
62.6918	2	<.0001

Source: Author

The occupational specialty variables proved to be jointly significant at the .01 level. This indicates that these variables together are significant in the model and that occupation is useful in helping to predict retention behavior. Table 5.20 shows the values associated with the joint significance test.

Table 5.20 2001 Model Joint Significance Test for Occupational Specialty

Wald Chi-Square	DF	Pr > ChiSq
68.8320	9	<.0001

Source: Author

The deployment status variables also proved to be jointly significant at the .01 level. This indicates that deployment characteristics together are significant in the model and are useful in helping to predict retention behavior. Table 5.21 shows the values associated with the joint significance test.

Table 5.21 2001 Model Joint Significance Test for Deployment Status

Wald Chi-Square	DF	Pr > ChiSq
95.3608	5	<.0001

Source: Author

Minority race/ethnic group membership proved to be significant at the .01 level in a restricted model test. This indicates that these variables together are significant in the model and are useful in helping to predict retention behavior. Table 5.22 shows the values associated with the joint significance test.

Table 5.22 2001 Model Joint Significance Test for Race/Ethnic Status

Wald Chi-Square	DF	Pr > ChiSq
42.1381	3	<.0001

Source: Author

5. Potential Problems with the 2001 Model

As with the 1998 model, multicollinearity was a problem for the 2001 model. The techniques employed in the 1998 model were used to reduce the problem in the 2001 model and the resulting effects were the same.

Table 5.23 Test for Multicollinearity in the 2001 Model
Model VIF=1.1115

Variables	Parameter Estimates	VIF
INTERCEPT	1.12369	0
FEMALE*	-0.00746	1.42221
BLACK*	0.12452	1.20093
HISPANIC*	0.04037	1.4120
OTHERRACE*	0.13841	1.17037
SOMECOLLEGE*	-0.06790	1.11650
SEA_NODEPLOY*	0.08165	1.17752
SEA_SINGLEDEPLOY	0.50927	1.11317
SEA_MULTIPLEDEPLOY	0.59256	1.03523
SHORE_SINGLEDEPLOY	0.44938	1.06514
SHORE_MULTIPLEDEPLOY	0.54145	1.01902
DEPS1OR2*	0.07632	2.33120
DEPS3ORMORE*	0.16079	1.54365
PG04*	0.2438	1.19485
PG05_06*	0.2376	1.25121
ADSPOUSE	0.4296	1.05765
CIVSPOUSE*	-0.3335	2.48714
FMFHM*	-0.0282	2.49788
SURGICAL TECH*	-0.08230	1.23446
ADVXRAY	-0.14974	1.01909
BSCXRAY*	-0.16049	1.16369
PHARMACY*	0.08917	1.34107
LABTECH*	-0.00178	1.19065
PMT	0.04249	1.0404
PSYCHTECH	0.10251	1.08781
OTHERNEC*	0.03269	1.52065
AGE*	-0.07658	1.27828

* Variable VIF higher than model VIF

Source: Author

As with the 1998 model, omitted variable bias is a potential problem for the 2001 model and could compromise the predictive usefulness of the model.

D. COMPARISON OF THE RESULTS FROM THE 1998 AND 2001 LOGISTIC REGRESSION MODELS

Table 5.24 provides a comparison of the significance of the variables from the two Logistic Regression Models. The Female variable was not significant in the 1998 model; however, it was significant in the 2001 model. Though females represented a smaller percentage of the 2001 sample, their reenlistment rate was significantly higher than those in the 1998 sample. Approximately 54 percent of females reenlisted in 2001 compared to approximately 28 percent in 1998 which might explain the significance of the female variable in the 2001 model. The race/ethnic variables are significant in both the 1998 and 2001 models and have positive signs. The college indicator variable (SOMECOLLEGE) is significant in both models and has negative signs. The effect of the deployment variables is the same for both models with all the deployment variables significant and having positive signs.

The dependent status variables are significant in both the 1998 and 2001 models with the same positive effect on retention. Additionally, a test for joint significance showed that these variables were jointly significant in both models. The active duty spouse variable and the civilian spouse variable are significant in the 1998 model but not the 2001 model. One possible explanation is that a larger percentage of the 1998 sample is married and therefore the effect of being married weighs heavier and becomes more significant for individuals in the 1998 sample.

The pay grade variable PG04 is significant in both the 1998 and 2001 models. The variable PG05_06 is significant only in the 2001 sample. A larger percentage of the 2001 sample is in pay grades E-5 and E-6 compared to the 1998 sample which might explain its significance in the 2001 model and not the 1998 model.

The occupational specialty variables FMFHM and ADVXRAY are not significant in either of the two models. The SURGICALTECH variable is significant only in the 1998 model. The BSCXRAY and PSYCHTECH variables are significant in both the 1998 and 2001 models and the PHARMACY, LABTECH and PMT variables are

significant only in the 2001 models. All occupational specialty variables were proven to be jointly significant in both models.

The current age variable (age) is significant in the 1998 model but not in the 2001 model. Given the fact that the average age of the 2001 sample is significantly older than the 1998 sample I expect individuals in the 2001 sample to be more decisive in their actions and therefore I expect age to be less significant when making a decision in 2001 as opposed to 1998

Table 5.24 Comparisons of Variables in the 1998 and 2001 Logistic Regression Models

Variables	1998 N=4340	2001 N=3233
FEMALE	NS	S
BLACK	S	S
HISPANIC	S	S
OTHERRACE	S	S
SOMECOLLEGE	S	S
SEA_NODEPLOY	S	S
SEA_SINGLEDEPLOY	S	S
SEA_MULTIPLEDEPLOY	S	S
SHORE_SINGLEDEPLOY	S	S
SHORE_MULTIPLEDEPLOY	S	S
DEPS1OR2	S	S
DEPS3ORMORE	S	S
PG04	S	S
PG05_06	NS	S
ADSPOUSE	S	NS
CIVSPOUSE	S	NS
FMFHM	NS	NS
SURGICAL TECH	S	NS
ADVXRAY	NS	NS

BSCXRAY	S	S
PHARMACY	NS	S
LABTECH	NS	S
PMT	NS	S
PSYCHTECH	S	S
OTHERNEC	NS	S
AGE	S	NS

S=Significant at least at the .10 level

NS =Not Significant at least at the .10 level

Source: Author

E. COMPARISON OF THE 1998 AND 2001 PARTIAL EFFECTS RESULTS

A comparison of the results of the partial effects for 1998 and 2001 shows strong similarities among some variables and vast differences among others. The notional person's probability of reenlisting was .22 percentage points lower in 1998 compared to 2001.

For someone with the same characteristics as the notional person except that she is female, the retention probability increases by .97 percentage points in 2001 compared with 1998. Being female was not a factor in determining retention behavior in the 1998 sample. The race/ethnic variables all positively influenced the probability of retention in both years. The partial effect of being black was .08 percentage points lower in the 1998 sample compared to the 2001. If the Individual was Hispanic, the increased probability of reenlisting was .05 percentage points higher in 2001 than in 1998. For an individual who was not black, Hispanic or white the increased probability of reenlisting was .12 percentage points higher in 2001 than in 1998. Having some college education decreased the probability of reenlisting in both years, by 6.39 percentage points in 1998 and 6.45 percentage points in 2001.

The partial effects of the deployment status variables and the dependent status variables are similar in both samples. The partial effect of the PG04 variable is also similar for both years. On the other hand, the PG05_06 variable has no effect on reenlistment in the 1998 model but increases the probability of reenlisting in the 2001

model by 31.93 percentage points. Similarly, the marital status variables have no effect on reenlistment in the 2001 model but increase the probability of reenlisting in the 1998 model by 2.11 percentage points for an individual with an active duty spouse and .18 percentage points for an individual with a civilian spouse.

The probability of reenlisting increases in both models for an individual who is a Basic X-ray Technician. The increased probability of reenlisting is .09 percentage points higher for a Basic X-ray Technician in the 2001 sample compared to the 1998 sample. Being a Surgical Technician decreases the probability of reenlisting in the 1998 model by 3.22 percentage points but has no effect in the 2001 model. Being a Pharmacy Technician, Laboratory Technician or Preventive Medicine Technician increases the probability of reenlisting in the 2001 model by 4.08, 3.20 and 14.59 percentage points respectively. These occupational specialties have no effect in the 1998 model. Being a Psychiatry technician decreases the probability of reenlisting in the 1998 model by .90 percentage points and similarly by .91 percentage points in the 2001 model.

For an individual similar to the notional person except that their age is greater by one year, the probability of reenlisting increases by .42 percentage points in the 1998 sample. Age is not significant in the 2001 model and has no effect on reenlistment.

F. CONCLUSION

Hospital Corpsmen form the base of the Navy's medical system. While they are faced with deployments during periods of war and when assigned to operational units and aboard ships, the majority of Hospital Corpsmen are seldom deployed and rarely engage in combat operations. Unlike many ratings in the Navy who spend most of their time at sea, it is not unusual to find Hospital Corpsmen who spend a great deal of time in the Navy and are never deployed or assigned to sea duty.

The events of 11 September, 2001 saw the beginning of a period of intense and lengthy deployments. Hospital Corpsmen were called upon to deploy in support of operations in Afghanistan and the war in Iraq. Given the significant increase in retention (20%) for the 2001 sample, it can be assumed that during periods of hostility, Hospital Corpsmen develop a greater sense of patriotism and embrace the opportunity to defend

the United States. Additionally, this may be an indicator that Hospital Corpsmen desire assignments to more operational platforms and are motivated by the opportunity to serve in combat related environments.

Given the marketability of Hospital Corpsmen in the civilian sector, another plausible explanation for the differences that exist between the 1998 and 2001 groups could be that the 1998 economy was more stable and offered more job opportunities for those Hospital Corpsmen leaving the service. On the other hand, the opportunities for civilian employment may have decreased for personnel in the 2001 sample which forced them to remain on active duty and accounted for the higher probability of reenlistment.

In the 2001 model, the probability of reenlistment was significantly greater for females than for males. The female variable was not significant in the 1998 model. This could mean that females are becoming more comfortable with life in the military and are just as eager to serve in combat situations as their male counterparts.

Another explanation for the differences that exist among the two year groups may be advancement opportunities. In the 2001 model, pay grades E-5 and E-6 were significant and positively influenced retention. The E-5 and E-6 pay grades were not a factor in the 1998 model. The data indicated that more people were advanced to these pay grades in the 2001 sample which may help explain the higher retention probability associated with the 2001 sample.

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VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The purpose of any retention study is to identify those factors that influence an individual's decision to stay in the service as well as those factors that contribute to a voluntary departure from active duty. This study not only identified potential factors that might affect the retention decision but also examined the impact of increased operational tempo particularly following the events of September 11, 2001.

This study found that retention rates for first term Hospital Corpsmen had increased by approximately 20 percent following September 11, 2001 as opposed to the period of September 1998. This particular finding indicates that individuals in this rating are more likely to remain on active duty during periods of combat and extended deployments. While this could be attributed to increased patriotism, an increased desire to protect our nation, or the longing to do that which it is they had signed up to do, it is important to note that there are additional factors such as the stability of the economy, propensity to find a good civilian job, monetary and Selective Reenlistment Bonuses (SRB) and other compensation that could account for this positive trend in retention. Those additional factors were not investigated in this particular study. Additionally, personnel in the 2001 sample were older than those in the 1998 sample, represented a larger percentage of minorities and were more likely to be in pay grades E-4 and E-5/E6 than in pay grade E-3, all factors that might explain their increased propensity to remain on active duty.

The retention rate for females (53.47%) was higher than that of males (51.01%) in 2001. This is particularly interesting since the percentage of females in the 2001 sample is significantly lower than that in the 1998 sample. While females made up 31.52 percent of the 1998 sample, they only accounted for 24.93 percent of the 2001 sample. The fact that females reenlisted at a higher rate than males in 2001 may be an indication that females are more adaptable to military life than they have been in the past. It may also be an indicator of the changes that have taken place in the military over the years. Recent

legislation has increased opportunities for females to serve in combat support occupations.

Since the introduction of the all volunteer force, the number of minorities entering the service has increased and continues to increase (Phillips, Andrisani & Daymont, 1988). The retention rates for Blacks and Hispanics were higher than those of Whites in both 1998 and 2001. The finding of this study is consistent with that of previous studies which have indicated that minorities have a higher propensity to enlist and remain in the service (Quester, 2002; Phillips et al., 1988).

A Hospital Corpsman's occupational specialty was a decisive factor in determining retention behavior. Basic X-ray Technicians had a higher propensity to remain on active duty than General Duty Corpsmen in both periods examined. The data also showed that 86 percent of Basic X-ray Technicians reenlisted in 2001. While this is a viable specialty in the military, Basic X-ray Technicians unlike Laboratory Technicians or Advanced X-ray Technicians do not possess the certifications necessary to obtain employment in the civilian sector which may account for their high reenlistment rates. While Pharmacy Technicians are highly marketable in the civilian sector they had a higher propensity to reenlist than a General Duty Corpsman in the 2001 sample. This behavior is unexpected and cannot be explained at this time.

The literature review showed mixed results for the impact of increased deployments on reenlistment. In some instances, increased deployments were shown to have a negative effect on reenlistment while in other instances there was no effect or very minimal effect. This study found that increased deployments positively impacted reenlistment. Regardless of the type of duty to which an individual was assigned (shore or sea) and the frequency of deployments, reenlistment rates were shown to increase in all instances. Additionally, those rates were even higher for the period following September 11, 2001.

This study clearly shows that the willingness to serve is intensified during periods of conflicts. What motivates an individual to remain on active duty during periods of hostility is a topic for future research. For the purpose of this study, it is reasonable to assume that individuals are emotionally ignited by a direct threat to the nation's security

particularly by events such as those that occurred on September 11, 2001. The military has made significant strides in reducing the gap between military and civilian wages, which could further influence individuals to remain in the service. On the other hand, it is equally important to note that factors such as a high unemployment rate could produce the same effect.

B. RECOMMENDATIONS

While this study offers some insight into the retention behavior of Hospital Corpsmen, it is important to note that it has a number of limitations. While the study was able to produce information on the frequency of deployments, there was no information available to assess the length of deployments and the areas to which an individual deployed. While the frequency of deployments was useful, previous studies have also evaluated lengths of deployment in determining the effect of deployments on retention behavior. The area to which deployed e.g. Afghanistan or Iraq and the platform to which assigned i.e. Marines, Seabees or Special Operations, would have been very useful in analyzing retention behavior in this study but was not available for inclusion.

Another shortfall of this study was the lack of information on reasons why individuals separated from the service. While this study provides information on those factors that might influence the retention decision, there were no variables included in the study that directly addressed an individual's reason for leaving the service such as satisfaction with military life or propensity to find a good civilian job. These variables are often obtained from survey data used in retention studies.

No attempt was made in this study to examine the reenlistment decisions of those in the Dental Technician (DT) rating which is very similar to the Hospital Corpsman rating. Given the recent and ongoing merger of the Hospital Corpsman (HM) and Dental Technician (DT) ratings, future research should be conducted that offers a comparison between the two ratings prior to the merger and a study of the combined rating after the merger to get an accurate representation of the effects on retention of merging both ratings as well as those factors that most influence retention of the newly combined Dental Technician and Hospital Corpsman ratings.

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